C-1032

FINAL SPECIFICATIONS

FOR

AWBERC FIRE ALARM SYSTEM UPGRADE

FOR

ADA COMPLIANCE PROJECT

FOR THE

U.S. ENVIRONMENTAL PROTECTION AGENCY

AT THE

ANDREW W. BREIDENBACH ENVIRONMENTAL RESEARCH CENTER (AWBERC)

26 W. MARTIN LUTHER KING DRIVE
CINCINNATI, OHIO

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SECTION 00460

LIST OF ALTERNATES

Alternate E-1: Add or deduct to perform all installation work, etc. during shift time or night time hours from 6:00 p.m. to 6:00 a.m. Monday through Friday or any time on Saturday and Sunday or federal holidays. All tie-ins and equipment demonstrations included in base bid must occur between 6:00 p.m. and 6:00 a.m., or anytime Saturday, Sunday or federal holidays.

END

DIVISION I - GENERAL REQUIREMENTS

SECTION 01005 - GENERAL CONDITIONS

1. Any reference to brand names in the Specifications/Drawings is for the convenience of the Contractor. The brand name products have the acceptable performance characteristics required for this project and are intended to establish minimum performance standards, not to limit competition. (See the clause MATERIAL AND WORKMANSHIP (FAR 52.236-5) in Section H of the contract Schedule.)

2. Any reference in the Specifications to approval by the Engineer, the Owner, and/or any official other than the Contracting Officer shall be read to mean approval by the Contracting Officer when any of the following conditions apply:

   C The issue affects the contract price (increase or decrease).

   C The issue increases or decreases the contract period of performance.

   C The issue involves a change within the contract scope of work.

3. Any reference in the Specifications to approval by the Engineer, the Owner, and/or any official other than the Contracting Officer shall be read to mean the Project Officer when the conditions cited in paragraph 2 above are not applicable, and when the issue involves the technical requirements of the contract.

4. The word "will" when used in the Specifications in reference to the responsibilities of the Contractor, has the legal force and effect of the word "shall" and shall be read to mean that the responsibility is an enforceable contract requirement.

5. All references to subcontractor responsibilities/warranties/ reports/notifications shall be read to mean the prime contractor. Privity of contract is between the Government and the prime contractor only.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010 - SUMMARY OF WORK

1.01 - CONTRACT

A. The work covered in the Contract Documents, which include the Specifications, is for supplying and installing and other related work as required in the Contract Documents for: Furnishing, installing, testing and warranty of an expansion of the existing fire alarm system for compliance with ADA requirements and the latest revision of the Building Code.

AWBERC FIRE ALARM SYSTEM UPGRADE
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B. One prime contract will be awarded for all work as indicated on the drawings and the following specification divisions and sections of work, but not limited to the following SECTIONS:

01010, 01027, 01040, 01095, 01200, 01300, 01310, 01400, 01500, 01515, 01540, 01558, 01560, 01600, 01700, 01740, 02060, 05125, 07270, 07920, 09900, 16010, 16020, 16030, 16111, 16115, 16130, 16451, 16720, 16950.

C. There will be one 'prime,' 'lead,' or 'general' contractor for all the work described herein and in the contract documents. The 'prime' contractor shall be responsible for all work performed and shall coordinate all disciplines. This prime contract work can be performed by either discipline involved in the work.

D. Contractor shall provide all plant equipment, superintendence, labor, material, appliances, skills, coordination, scheduling and service necessary for the construction and installation of the work in accordance with these Specifications, subject to terms and conditions of the Contract Documents.

E. Work not indicated on the Drawings, but otherwise addressed in the Specifications, and vise versa, is herein made a part of the work. The extent of the work is generally indicated on the Drawings.

F. Damaged or used materials shall not be used in the work.

G. General Conditions: The General Condition of the Contract for Construction, Form A201,1987 Edition, as prepared and published by the American Institute of Architects and all

documents referenced therein, are hereby made a part of these specifications to the same extent as if written out in full and shall govern the performance of this contract. Government documents or requirements shall be followed as in force where conflicts exist with the General Conditions, Form A201.

H. The following materials are prohibited, as applicable:

1. Products containing asbestos
2. Products containing urea formaldehyde
3. Products containing polychlorinated biphenyls
4. Paint containing more than 0.06 percent lead

2.01 - PROJECT LOCATION

ANDREW W. BREIDENBACH ENVIRONMENTAL RESEARCH CENTER
26 WEST MARTIN LUTHER KING DRIVE
CINCINNATI, OHIO 45268

3.01 - SCOPE AND PHASING OF WORK

The list below shall be used for the Contractors to follow and to consider when bidding. A final schedule will be arranged through the EPA's On-Site Representative.

A. After award of the Contract, scheduling will be approved by the EPA's On-Site Representative. Work will proceed as follows:

1. Shop drawings shall be submitted within twenty (20) days after Notice to Proceed.
2. Preliminary submissions: Performance bonds, insurance, and any other requirements per contract documents. Complete list of Subcontractors and suppliers for approval.
3. Preliminary submissions of equipment and materials for approval by the Engineer, including shop drawings, equipment data, samples, etc. as required.
4. Preparation and coordination of schedule of work with Contractors and the EPA.
5. Equipment and materials delivery coordination to project site with EPA's On-Site Representative.
6. Coordination of the work by all Contractors.
7. General Construction work and Electrical work.
8. Manufacturer's assistance as required during installation by each Contractor.
9. Start-up, testing and adjustment as required.
10. Punch-list preparation and completion of work.
11. EPA’s personnel operating training as required.
12. Manuals submissions.

13. Guarantees submissions.
14. Any other required work or equipment to complete the work.

B. The contractor shall provide additional staffing, extended work days, second daily shifts, and all other related services and costs to complete and meet the schedule requirements of the EPA Contracting Officer. All these costs shall be made part of the base bid proposal submitted by the contractor.

C. No services shall be shut down during installation if not previously scheduled during EPA non-business hours and if not scheduled a minimum of fourteen (14) calendar days in advance.

D. Work in office area shall not commence until all materials are available at site. Sequence work so that items in one (1) room are substantially completed prior to continuing elsewhere, where possible.

E. See drawings for electrical scope of work. Provide all work associated with this project.

3.02 - INSPECTION OF SITE

A. Each bidder shall inspect the site and premises of the existing building. Conditions shall be compared with information in the drawings and specifications. Report immediately to the Contracting Officer any significant discrepancies which may be discovered. After the contract is signed, no allowance will be made for failure to have made a thorough inspection.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 - SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1. Coordinate the Contract Cost Breakdown with Applications for Payment with the Work Breakdown Structure of the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Section 01310 Progress Schedules.

1.02 - CONTRACT COST BREAKDOWN

A. Coordination: The Prime contractor shall coordinate the preparation of the Contract Cost Breakdown with the Construction Schedule.

1. Correlate line items in the Contract Cost Breakdown with other required administrative schedules and forms, including:

a. Contractor's Construction Schedule.
b. Application for Payment forms.
c. List of subcontractors.
d. Schedule of alternates.
e. List of products.
f. List of principal suppliers and fabricators.
g. Schedule of submittals.

2. Submit the Contract Cost Breakdown to the Engineer and the EPA at least fourteen (14) calendar days prior to first pay voucher.

B. Format and Content: Provide at least one (1) line item for each Specification Section.

1. Provide Contract Cost Breakdown in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
2. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
3. Provide a separate line item in the Contract Cost Breakdown for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.

    a. The EPA may refuse to pay for materials delivered ahead of schedule if it is apparent they have been ordered to "front load" the Project payments.
    b. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

4. Provide separate line items on the Contract cost Breakdown for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
5. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Contract Cost Breakdown and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
6. The Engineer and the EPA will review the initial Contract Cost Breakdown submittal and respond with revisions and additional line items required.
7. The Contractor shall modify the Contract Cost Breakdown as required.
8. Contract Cost Breakdown Updating: Update and resubmit the Contract Cost Breakdown prior to the next Application for Payment when Change Orders result in a change in the Contract Sum.

1.03 - APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be based on the approved Contract Cost Breakdown and consistent with previous applications and payments.

1. The initial Application for Payment and the final Application for Payment involve additional requirements.

B. Payment-Application Times: The period of construction Work covered by each Application for Payment is the period indicated in the Contract.

C. Application Preparation: Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The EPA will return incomplete applications without action.

1. Entries shall match data on the Contract Cost Breakdown and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders approved prior to the last day of the construction period covered by the application.
3. Include all necessary documentation required to demonstrate Contractor's right to payment. Provide such additional documentation as requested by the EPA.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01040 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 - SUMMARY

A. This Section specifies minimum administrative and supervisory requirements necessary for coordination on the Project to be collectively fulfilled by the Prime Contractor including, but not limited to:

1. Coordination
2. Administrative and supervisory personnel
3. General installation provisions
4. Cleaning and protection

B. Where applicable, the Prime Contractor shall participate in these coordination requirements, even though certain areas of responsibility are assigned to a specific Subcontractor.

C. Progress meetings, coordination meetings and pre-installation conferences are included in Section 01200 - PROJECT MEETINGS.

D. Requirement for the Contractor's Construction Schedule is included in Section 01310 - PROGRESS SCHEDULES.

1.02 - COORDINATION

A. Coordination: The Prime Contractor shall coordinate its construction activities with those of its subcontractor and other entities involved to assure efficient and orderly installation of each part of the Work. The Prime Contractor shall coordinate its operations with operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, each Subcontractor shall schedule its construction activities in the sequence required to obtain the best results.
2. Where sleeves, cutouts, chases, and similar provisions are required for the Work of a particular trade, the Subcontractor responsible for

that trade shall furnish and place sleeves and other such required components and shall layout and coordinate the installation of his Work with the Work of other affected Subcontractors and the Prime Contractor.

3. Where availability of space is limited, each Subcontractor shall coordinate installation of different components with other Subcontractors to assure maximum accessibility for required maintenance, service and repair.
4. Each Subcontractor shall make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination.

C. Administrative Procedures: The Prime Contractor shall coordinate scheduling and timing of its administrative procedures with other construction activities and activities of other Subcontractors to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to:

1. Preparation of schedules
2. Installation and removal of temporary facilities
3. Delivery and processing of submittals
4. Progress meetings
5. Contract Closeout activities

D. Conservation: The Prime Contractor shall coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage or disposal of materials and equipment involved in performance of, but not actually incorporated in, the Work.

E. Work that interferes with the operations of existing occupants shall require any or all parts of the Contractor's work to be done on 3rd shifts, weekends or other times as required to avoid interruptions. No compensation will be provided for any additional expenses or work.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 - GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: The Contractor involved shall require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Recheck measurements and dimensions before starting each installation.

F. Install each component during conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Enclosure of the Work: Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of the uncovering completed construction for that purpose.

3.02 - CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure freedom from damage or deterioration at Contract Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: The Prime Contractor shall supervise its construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:

1. Excessive static or dynamic loading
2. Excessively high or low temperatures
3. Thermal shock
4. Excessively high or low humidity
5. Air contamination or pollution
6. Water or ice
7. Solvents
8. Chemicals
9. Light
10. Puncture
11. Abrasion
12. Heavy traffic
13. Soiling, staining and corrosion
14. Bacteria
15. Rodent and insect infestation
16. Combustion
17. Electrical current
18. High speed operation
19. Improper lubrication
20. Unusual wear or other misuse
21. Contact between incompatible materials
22. Destructive testing
23. Misalignment
24. Excessive weathering
25. Unprotected storage
26. Improper shipping or handling
27. Theft
28. Vandalism

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.01 - DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Contract Officer," "requested by the Contract Officer," and similar phrases.

D. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract. No cost change resulting from a review is authorized unless approved by the Contract Officer.

E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

I. Installer: An "Installer" is the Subcontractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having compiled with requirements of the authority having jurisdiction.
2. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.
3. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

    a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work.
    b. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

I. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

1.02 - SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and 1988 MASTER FORMAT numbering system.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

    a. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.03 - INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Contract Officer for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Associate for a decision before proceeding.

C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
2. Refer to the schedule of required resource standards at the end of this Section.

D. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provisions. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

1.04 - SUBMITTALS

A. Certificates: For the EPA's records, submit copies of licenses, certifications, inspection reports, releases, notices, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.01 - DESCRIPTION

A. Scope: To enable orderly review of submissions and to provide for systematic discussion of problems and coordination, the EPA's On-Site Representative will conduct Project Meetings throughout the construction period.

B. Related Work Described Elsewhere: The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and are not part of Project Meetings content.

1.02 - QUALITY ASSURANCE

A. Persons designated by the Contractor to attend and participate in the Project Meetings shall have all required authority to commit the Contractor to solutions agreed upon in the Project Meetings.

1.03 - SUBMITTALS

A. Minutes: Contractor will compile minutes of each Project Meeting. The Contractor will make and distribute copies to all parties.

PART 2 - PRODUCTS

A. Related items per Divisions 1 to 16 requirements.

PART 3 - EXECUTION

3.01 - MEETING SCHEDULES

A. **Pre-Construction Meeting:** This meeting will be held when scheduled by the Contract Officer. The Contractor shall provide attendance by authorized representatives of the Contractor and all major subcontractors. The EPA's On-Site Representative will advise other interested parties. The AE Representative will compile and distribute minutes

of the Pre-Construction Meeting.

B. **Project Meetings:** These meetings shall be held bi-weekly, or as required by the EPA's On-Site Representative. To the maximum extent practicable, assign the same person or persons to represent the Contractors at Project Meetings throughout progress of the work.

C. **Punch List Meeting:** This meeting shall be held near the completion of the project. It shall consist of a complete tour of the project by the Engineer or the EPA's On-Site Representative to compile a list of defects or incomplete areas in the project.

D. **Project Conclusion:** This meeting shall be to confirm completion of punch list items and to check all electrical items for proper operation and balance at the completion of the punch list items.

3.02 - MEETING LOCATION

A. Meetings will be held at job site as required by the EPA.

3.03 - PRE-CONSTRUCTION CONFERENCE

A. The EPA shall schedule a pre-construction conference and organizational meeting at the Project site or other convenient location when scheduled by the Contract Officer and prior to commencement of construction activities.

B. Attendees: The EPA, Engineer, the Prime Contractor and superintendents, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Construction schedule
2. Critical Work sequencing
3. Designation of responsible personnel
4. Coordination
5. Administrative procedures
6. Use of the premises, housekeeping and security
7. Equipment deliveries and priorities
8. First aid and safety procedures

3.04 - PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the EPA's On-Site Representative of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference including requirements for:

    a. Contract Documents, manufacturer's recommendations, options, and related Change Orders.
    b. Shop Drawings, Product Data and quality control Samples.
    c. Possible conflicts, compatibility problems, and weather limitations.
    d. Time schedules, coordination, deliveries and acceptability of substrates.

2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the EPA's On-Site Representative and the Engineer.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

3.05 - COORDINATION MEETINGS

A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. The Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

3.06 - PROGRESS MEETINGS

A. The Prime Contractor shall conduct progress meetings at the Project site at regularly schedule intervals. Notify the EPA's On-Site Representative and the Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the EPA and the Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including such items as:

    a. Interface requirements
    b. Time
    c. Sequences
    d. Deliveries
    e. Off-site fabrication problems
    f. Access
    g. Site utilization
    h. Hazards and risks
    i. Housekeeping
    J. Quality and Work standards

D. Reporting: The Contractor shall record meeting results. No later than five (5) days after each progress meeting date, the Contractor shall distribute copies of minutes of the meeting to each prime contractor. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: The Prime Contractor shall revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule monthly.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 - SUMMARY

A. Requirements Included: Submittal requirements specified in this Section include:

1. Shop drawings.
2. Product data.
3. Samples.
4. Certifications.
5. Test or inspection reports.
6. Miscellaneous work-related submittals.

B. Individual submittal requirements are specified in applicable sections for each unit of work.

C. Shop drawings are to be submitted within twenty(20) calendar days after the Notice to Proceed.

D. Related Requirements: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Applications for payment.
2. Insurance certificates.
3. Listing of subcontractors/suppliers/materials.
4. Project Schedules.
5. Project Record Documents.
6. Maintenance data and parts.

1.02 - DEFINITIONS

A. Work-related submittals of this Section are categorized for convenience as follows:

1. Shop Drawings: Shop drawings include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.
2. Product Data: Product data include standard printed information on materials, products and systems; not specially-prepared for this project, other than the

designation of selections from among available choices printed therein.

3. Samples: Samples include both fabricated and unfabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.
4. Certification: Certificates of conformance or compliance are documents attesting that a product complies with a specified standard.
5. Test Reports: Certified test (or inspection) reports are documents attesting that a product meets a specified level of performance or quality when a prototype specimen is tested or inspected in accordance with a specified procedure, and consist of a certified statement by the product supplier or Contractor accompanied by a complete report of the inspection or test.
6. Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data samples, certificates of conformance or compliance, or certified test reports.

1.03 - GENERAL SUBMITTAL REQUIREMENTS

A. General:

1. All submittals, unless specifically noted otherwise in the Specifications, shall be made simultaneously to the Engineer through the Contractor.
2. Only the Engineer can approve or disapprove submittals. Deviations and variations from the contract requirements contained in the submittal can be approved only by the Contract Officer.
3. Failure on the part of the Contractor to indicate approval on submittals prior to submission to the Engineer will result in their being returned to the Contractor without being acted upon.
4. No delays in construction occasioned by the Contractor’s failure to submit material for approval in accordance with the approved schedule will be excused.

B. Scheduling: Submit schedule of submissions for approval by the Engineer, within twenty (20) calendar days after Notice to Proceed.

C. Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for same work, and for interfacing units of work, so that one will not be delayed for coordination of the Engineer's review with another.

1. All submittals of samples for materials finish selections shall be submitted at one time to allow coordination of colors and finishes for the entire project. See requirements for combined preliminary sample submittal below.
2. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are forthcoming.

B. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, subcontractor, submittal name and similar information to distinguish it form other submittals.

C. Show Contractor's executed review and approval marking and provide space for the Engineer's action marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through Contractor's office will be returned without action.

1. Record relevant information and requests for data on the transmittal form. On the form, or an attached separate sheet, record deviations from requirements of the Contract Documents, including minor variations and limitations.
2. Include the Contractor's signed certification stating that information submitted complies with requirements of the Contract Documents.

1.04 - SPECIFIC SUBMITTAL REQUIREMENTS

A. General: Except as otherwise indicated in individual work sections, comply with requirements specified herein for each indicated category of submittal. Provide and process intermediate submittals, where required between initial and final, similar to initial submittals.

B. Shop Drawings: Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which are based on field measurement. Highlight, encircle or otherwise indicate deviations from the Contract Documents. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements. Do not allow shop drawing copies without stamp indicating approval by the Engineer to be used in connection with the work.

1. Initial Submittal:

   a. Engineer: One (1) correctable translucent reproducible print and one blue-line or black-line print; reproducible will be returned.

2. Final Submittal:

   a. Engineer: One (1) correctable translucent reproducible print and one blue-line or black-line print; reproducible will be returned. A copy of each approved shop drawing is to be maintained by Contractor as "Record Document."

2. Equipment and Systems: Shop drawings for equipment and systems shall show ratings (where applicable), and how components are assembled, function together, and how they will be installed. Shop drawings, product data, certificate of conformance or compliance, certified test or inspection reports, and other submittals for equipment, systems, and their component parts shall be coordinated and submitted as a unit. Multiple or piecemeal submissions are not acceptable except where prior approval is obtained from the Engineer, in which case a list of data to be submitted later shall be included with the first submission.

C. Product Data: Collect required data into one (1) submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one (1) set of product data (for each submittal) at project site, available for reference.

1. Submittals: Contractor shall not submit product data, or allow its use on the project, until he has confirmed compliance with requirements of contract documents. Submittal is for information and record, unless otherwise indicated. Initial submittal is final submittal unless returned by the Engineer, marked with an action which indicates an observed noncompliance. Submit sufficient quantity for the Engineer to retain one (1) copy and the EPA's On-Site Representative to retain one (1) copy with the balance to be returned to the Contractor as he may require. Include additional copies (which will be returned) where required for maintenance manuals.

    a. Provide preliminary single-copy submittals to Engineer where required (or desired by Contractor) for selection of options by the Engineer.
    b. Installer's Copy: Do not proceed with installation of materials, products or systems until final copy of applicable product data is in possession of Installer.

D. Certificate of Conformance or Compliance: Follow same procedure as for product data. Where feasible, and/or where required by other sections of specification indicate compliance with the specified standard by means of a label on the container, or on an inconspicuous place on the product.

E. Certified Test and Inspection Reports: Process each as either "shop drawings" or "product data," depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production; process accordingly.

1. Report shall include a description of the prototype specimen tested or inspected which is sufficiently descriptive to ensure positive identification of the product by an inspector when delivered and/or installed.
2. The report shall be accompanied by a notarized statement from the supplier of the product certifying that the prototype is identical in all respects to the product proposed for the project.
2. Where feasible and/or where required by other sections of the specification, indicate compliance with the specified performance or quality by means of a label on the container or on an inconspicuous place on the product. The label shall refer to the test or inspection report and include the date of the report.

F. Warranties (Guarantees): In addition to copies desired for Contractor's use, furnish three (3) executed copies, except furnish additional (conformed) copies where required for maintenance manuals.

G. Standards/Manufacturer's Recommendations: Where copy submittal is indicated, and except where specified integrally with "Product Data" submittal, submit two (2) copies to the Engineer. Where workmanship at project site and elsewhere is governed by standard, furnish additional copies to fabricators, installers and others involved in performance of the work. Installation of the item will not be allowed to proceed until the information is received. Failure to furnish the information can be cause for rejection of the material.

H. Closeout Submittals: Refer to individual work sections and to Section 01700 "Contract Closeout" for specific requirements on submittal of closeout information, materials, tools and similar items.

1. Record Document Copies: Furnish one (1) set including all wiring and conduit routing.
2. Maintenance/Operating Manuals: Furnish five (5) copies.
3. Progress Photographs: Furnish one(1)copy.
4 Final Photographs: Furnish one (1) copy.
5. Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

I. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, and others as necessary for proper performance of the work.

1.05 - ENGINEER'S ACTION

A. Except for submittals for the record, for information and similar purposes, where action and return on submittals is required or requested, the Engineer will review each submittal, mark to indicate the action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility, and not considered part of the Engineer's review and indication of

action taken.

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp.

1.06 - RESUBMISSION REQUIREMENTS

A. If the Engineer requires resubmission, make corrections required and resubmit as specified for initial submittals until approval is obtained.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01310 - PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 - WORK SEQUENCE

A. A complete project "Time and Progress" schedule should be developed in detail by the Prime Contractor. The schedule shall include work of all trades and Contractors including Shop Drawings. Schedule shall indicate all areas of work and dates for such work. Schedule shall be reviewed by the EPA's On-Site Representative and the Engineer. Schedule shall indicate individual floors and areas of floors where work is to be scheduled. Modifications and changes shall be incorporated as required. The final revised schedule shall be the guide for all work of all trades and shall be adhered to by all parties.

Construction schedule to include shop drawings schedule and submissions.

All construction must be accomplished at the convenience of the EPA. No work shall be undertaken which has not been previously scheduled on the date of the Time and Progress Schedule, when within an occupied area. If access to occupied areas is required which is not indicated on Time and Progress schedule, written notice must be given to EPA 48 hours prior to necessary access. Such access may be granted as conditions permit. Original Time and Progress schedule shall be revised and updated biweekly or as necessary, all revisions shall be reviewed and approved by all parties concerned.

1.02 WORKING CONDITIONS

A. If the work must be accomplished while building operations are continued, work will be permitted on a regular time basis (week days daily between 7:00 AM and 5:00 PM). All work associated with final tie-ins that will cause the fire alarm system to be non-operational and all testing of the system must be performed during EPA non-working hours. Items of work which will cause undue disruption of building operation must be scheduled for time periods as determined by the Contractor and EPA's On-Site Representative. Where items of work in progress will be detrimental to building operation as determined by authorized EPA's On-Site Representative, the item of work shall be stopped and re-scheduled. Orders for stoppage of work shall be given in writing

only by the Contracting Officer, as necessary, and all parties involved shall cooperate in re-scheduling the work at the earliest possible opportunity.

1.03 - CONSTRUCTION SCHEDULE

A. Contractor shall submit to the EPA's On-Site Representative and the Engineer a complete itemized Construction Schedule for demolition, purchasing of critical materials, new construction, and submittals within five (5) calendar days after work has commenced.

B. The Work Breakdown Structure (WBS) for the schedule must be approved by the EPA's On-Site Representative and the Engineer prior to the initial schedule submittal. In addition, this WBS must be the basis for the structure of the Contract Cost Breakdown.

C. All Subcontractors shall cooperate with the Prime Contractor in establishing the Work Breakdown Structure, developing the schedule, maintaining the progress and providing updated information weekly to the Prime Contractor to keep the schedule current.

D. An additional complete copy of the schedule is to be posted and maintained on the project site used for meetings as an ongoing project/working schedule.

E. The schedule is to be updated and submitted in the required format each month with the project Pay Request. The schedule must be approved monthly by the Engineer for the Pay Request to be approved. Progress for a particular activity shall be defined as the percent of field quantities installed as agreed to by the Engineer, the EPA's On-Site Representative and the Contractor.

F. The Engineer reserves the right to request that the schedule activities be presented in a different format or organization than described below.

G. The schedule shall be based on Primavera (P3 and Primavision, Windows Revision 2.0 or later). Programming requirements as outlined below.

H. <u>ONLY THOSE ACTIVITIES WHICH ARE 100 PERCENT COMPLETE MAY BE BILLED ON THE MONTHLY PAY REQUEST.</u>

I. Punch List must be completed within thirty (30) days and before contract completion.

J. The approved initial schedule and subsequent approved revised schedules will be the baseline schedule for

comparison of the current status of schedule. As required, schedule revision submittals will be accompanied by a change order to assure contract compliance (monthly schedule updates are not revisions to the baseline schedule).

1.04 - CONTRACTORS CONSTRUCTION REPORT

A. The Prime Contractor must submit their daily construction (superintendents) report on a weekly basis to the EPA's On-Site Representative. This report shall include the following items:

1. Contractors manpower by craft and the schedule activities on which they worked.
2. Subcontractors manpower and the schedule activities on which they worked.
3. Change Order work performed.
4. Weather Conditions.
5. Equipment on Site.
6. Materials Delivered.
7. Tests Performed.
8. Accidents/Delays/Unusual Conditions.

B. Failure to submit these reports on a weekly basis will delay processing of the Contractor's Pay Request.

1.05 - DELAYS

A. Delays in construction arising by virtue of the non-availability of a specified material and/or method will not be considered by the Contracting Officer as justifying an extension of the Contract Time.

B. If the work is not being completed in a manner which will obtain the completion date as outlined in the Contract, the work remaining to complete the Contract shall then be performed in such a manner, and at such times to cause the least interference or inconvenience to the EPA, as determined by the Contracting Officer. Any overtime, 3rd shift, Sunday or Holiday work necessitated, thereby, shall be provided by the Contractor without additional cost to the EPA.

C. Total Float is the measure of scheduling flexibility. This is a Contractor and Department shared commodity.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 - QUALITY ASSURANCE

A. QUALIFICATION OF MANUFACTURER

Products used on the work of this project shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the EPA's Representative.

B. QUALIFICATION OF INSTALLERS

Use adequate number of SKILLED WORKPERSONS who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this project.

C. SINGLE SOURCE

All like materials, or equipment involved in this project shall be produced by a single manufacturer unless otherwise approved by the EPA's On-Site Representative.

1.02 - JOB CONDITIONS

A. DUST AND WORK AREA ACCESS CONTROL

Use all means necessary to control dust from and access to and near the work and on and near all off-site areas if such dust is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site. All temporary partitions for work inside buildings shall be approved by the EPA and shall allow EPA access to adjacent areas so as to conduct normal operations activity in non-construction areas.

B. PROTECTION

Use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain. In event of damage, immediately make all repairs and replacements necessary to the approval of the EPA's On-Site Representative and at no additional cost to the EPA.

C. NOISE CONTROL

Use all means necessary to keep noise levels as low as possible. Make EPA aware of any equipment which produces loud noises.

1.03 - STANDARDS

A. Regulations: Contractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, Fire Department and Rescue Squad rules
5. Environmental Protection Agency (E.P.A.) regulations
6. NFPA 70, National Electric Code
7. NFPA 72, National Fire Alarm Code
8. NFPA 101, Life Safety Code
9. Uniform Federal Accessibility Standards (UFAS)
10. American Disability Act (ADA) Standards

B. Standards: Each prime Contractor shall comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".

1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC for industry recommendations.
2. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01500 - TEMPORARY FACILITIES AND USE OF CONSTRUCTION SITE

PART 1 - GENERAL

1.01 - RELATED DOCUMENTS

A. Specifications and general provisions of Contract, including General Conditions, Supplementary General Conditions and other Division 1 specification sections, apply to work of this section.

1.02 - TEMPORARY CONSTRUCTION

A. The Contractor shall provide all work required for access to the buildings and for protection of buildings and persons.

B. All work shall meet applicable Building Codes and Local, State or Federal regulations.

C. Remove all temporary facilities from premises upon completion, or earlier if so directed by EPA's On-Site Representative.

1.03 - BARRIERS AND ENCLOSURES

A. Provide barriers as required to keep people away from hazardous conditions and areas.

B. Required exitways from buildings and site shall be maintained as directed by EPA's On-Site Representative.

1.04 - ACCESS TO AND PROTECTION OF SITE

A. Existing driveways may be used, but vehicles shall not be parked on same.

B. Sidewalks were designed for pedestrian traffic only, and no other traffic shall be allowed over them.

C. Prior to beginning construction the Contractors shall record, through photographs and marked-up plans, all areas of damaged and defective paving, sidewalks and existing building components not included in the construction area. FAILURE TO DO THIS WILL MAKE CONTRACTOR RESPONSIBLE FOR REPAIRS WITHOUT ADDITIONAL COMPENSATION.

D. Where floors, etc. are exposed to possibility of damage, protect with heavy planking.

E. Arrange and maintain materials in an orderly manner with use of walks, drives, roads, entrances unencumbered.

1.05 - SECURITY

A. The Contractor shall be responsible for safeguarding ALL WORK in place or materials on storage at site or off-site and he shall be responsible for ALL losses from theft or any other type of damage. The EPA or the EPA's On-Site Representative will not be responsible for any materials, in storage or installed, equipment or tools until completion of the work.

B. All personnel must wear identification badges while working within the building. Badge may be obtained through the EPA's On-Site Representative.

1.06 - PROTECTION OF EXISTING BUILDINGS

A. All work shall cause least possible interference with operation of existing buildings.

B. The Contractor shall provide adequate protection for all parts of the buildings, its contents and occupants, wherever work is performed. Provide temporary partitions as required.

C. Prior approval of the EPA's On-Site Representative must be obtained before doing any cutting not shown.

D. Existing work damaged or defaced, due to work under this Contract, shall be restored to original condition.

E. The Contractor shall provide necessary barriers, warning signs, and other devices to insure that proper safety precautions are taken to prevent injury caused by his action to any person or damage to the property.

F. All the work shall be scheduled with the EPA's On-Site Representative so the operations of the building will be maintained at all the times.

G. Preserve fire exits of existing buildings during construction, when occupied.

1.07 - INTERRUPTION OF SERVICES

A. All work shall be carried on without interference to the EPA's use of premises outside of construction area. If necessary to restrict use temporarily, arrangements shall be made through the EPA's On-Site Representative not less than two (2) days before restriction.

B. All cutting or alteration work which may require shutting down of existing apparatus or service lines shall be done only at time scheduled with approval of EPA's On-Site Representative, prior to shutdown. At no time shall steam, water, fire line, electric power, security, phone, sewer or signal system be left out of service overnight or any non-working day. Disruption of any service requires a fourteen (14) calendar day notice to the EPA's On-Site Representative.

C. The Contracting Officer shall be notified immediately upon encountering any piping, conduit, or structural condition not shown or foreseen.

1.08 - PARKING AND DELIVERIES

A. Parking for Contractors, Subcontractors and employees of Contractors and Subcontractors shall be permitted at the extreme west end of the employees parking lot.

B. The Contractors and Subcontractors shall schedule deliveries with the EPA. All deliveries must be received by the installing Contractor. The EPA will <u>not</u> receive any deliveries.

C. Each Contractor may use the driveways for access to the site, but in doing so shall not park vehicles there and shall cause occupancy of driveways to be safe and brief.

1.09 - TEMPORARY STORAGE

A. Storage of materials on site shall be confined to spaces designated. Materials and equipment shall not be delivered to site until ready for installation.

B. Should it be necessary at any time to move materials, sheds, or storage platforms, responsible Contractor shall move same as and when directed, without extra compensation.

C. Sufficient space on site for tools and material storage will be arranged by the EPA's On-Site Representative. Entrance for employees and materials will also be directed by the EPA's On-Site Representative.

D. Paint and other flammable materials shall be stored only at a location approved by the EPA's On-Site Representative.

1.10 - TEMPORARY UTILITIES

A. TEMPORARY SANITARY FACILITIES
The EPA will provide temporary toilet facilities for all workmen until completion of the project. Each user to take reasonable care of the facilities and provide cleaning.

B. TEMPORARY ELECTRIC POWER AND LIGHTING
The use of existing electric system will be allowed if properly protected. In case of damage, it will be the responsibility of Contractor to repair it to acceptable condition.

All Sub-contractors requiring extensions for power tools shall provide their own up to 20 amperes.

All Sub-contractors requiring welders shall provide their own source of power.

The EPA shall pay for all power used for construction purpose.

Provide for temporary lighting as required to allow building functions to continue.

C. TEMPORARY PHONE
By Prime Contractor as required. Long distance calls to be paid by User. Project foreman to have a digital or voice pager or cellular phone at all times and must be accessible.

1.11 - PERIODIC CLEAN-UP AND REMOVAL OF RUBBISH

A. Contractor or Subcontractor to clean-up daily all trash and leftovers. Debris shall be promptly removed from site daily.

1.12 - REPAIRS AND PATCHING

A. When repairing or patching building components during construction, Contractor to adhere to the relevant contract specifications for all work. The quality will be based upon the standards established in the specifications and judged by the EPA's On-Site Representative. When repair work involves items not covered in project specifications, Contractor to consult the EPA's On-Site Representative to establish acceptable standards.

B. Employ workmen skilled in the trade required to patch components.

C. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

D. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01515 - CONSTRUCTION LIMITS AND ENCLOSURES

PART 1 - GENERAL

1.01 - GENERAL

A. Construction limits are shown on the Drawing. No Contractor activity is permitted beyond these limits except as defined in the Contract Documents without the written permission of the EPA which may be withheld at the EPA's discretion.

1.02 - LIMITS OF WORK AREA

A. Areas outside the construction limits may not be used by the Contractor for a staging area, storage of materials or any other purpose, except as designated in the Contract Documents. If the area so designated is deemed by the Contractor to be insufficient for the proper execution of his work, he shall so advise in writing with the submittal of his Bid. The areas designated at the time of execution of the Contract between the EPA and the Contractor shall be strictly adhered to. Such designated areas shall be restored by the Contractor to their previous condition upon completion of the work as directed by the EPA.

B. Contractor must notify the EPA of additional areas which must be temporarily closed off to accommodate the transporting of materials or equipment to or from a work area. Such closure shall be performed only with the EPA's approval and under such restrictions as it feels are necessary.

1.03 - MATERIAL AND EQUIPMENT DELIVERY AND STORAGE

A. No material may be stored outside of the construction limits unless otherwise designated on the Drawings. Refer to individual Specification Sections for limits on amounts of materials stored in work areas and other storage restrictions.

B. EPA reserves the right to refuse to allow any material it considers to be a fire hazard to be stored within any area on the EPA's property except as may be otherwise specified elsewhere.

C. All storage areas shall be cleaned and restored to their original condition in the same manner as any area within the construction limits.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01540 - SAFETY

PART 1 - GENERAL

1.01 - GENERAL

A. Contractor shall assume full responsibility for safety and protection of material and equipment stored at the site both within and outside the construction limits.

B. The Contractor shall be responsible for overall safety regulations for all Sub-contractors as specified by U.S. Department of Labor, Volume 36, No. 75.

C. Contractor shall protect his work and equipment from damage by the public.

D. Contractor shall take all necessary precautions during all phases of work to prevent any debris from falling and causing damage outside the enclosed Work Area. Contractor shall be held liable for all damage caused by dust and debris. Contractor shall be responsible for all injury to people or property caused by any construction related activity. Contractor is responsible for contacting people or the EPA and resolving complaints.

E. When work is performed which may create a hazard to persons or property above, below or in the proximity of work, those areas shall be blocked or otherwise protected to eliminate the hazard.

1.02 - EPA POLICY ON SAFETY AND ENVIRONMENTAL HEALTH

A. It is the policy of the EPA to provide a quality workplace environment which meets or exceeds applicable federal, state and local standards for health and safety. The EPA adheres to practices which meet or exceed applicable federal, state and local standards for the prevention of damage to or impact on the off-site environment. These practices include procedures relating to emissions by air, by liquid-carried wastes, by solid and hazardous waste disposal, or by sonic, radioactive, or electromagnetic radiation.

B. Equipment specification, work practices standards, and design principles are adopted by the EPA to effectuate this policy. Members of the EPA Community and Contractors hired by the EPA shall be responsible for following and implementing practices designed to minimize risk and thereby avoid harmful exposure to chemicals, biological, or radiological substances, and physical or mechanical hazards.

C. It is the policy of the EPA to require that all Contractors hired by the EPA are to use facilities and equipment in prescribed manners so as to avoid injury and health damage to themselves, others, and the environment.

D. It is the responsibility of the Contractor through the designated safety and health staff in work areas to assist all parties in maintaining safe and healthful conditions at the EPA.

E. The EPA Department of Safety shall assure to the maximum extent possible that physical facilities and equipment do not present an untold hazard of either physical injury or health damage.

1.03 - PROTECTION OF THE SURROUNDING AREA

A. All construction operations shall be conducted such as to protect the surrounding areas and adjacent building areas.

B. Fumes and dust shall be controlled so as to prevent any harmful or undesirable effects in the surrounding areas.

C. Construction work being done in an area that must be kept in operation shall be provided with a sheeted bulkhead to keep out dust and dirt and to isolate the area as much as possible. All drilling in occupied areas shall be performed with vacuum cleaner to minimize dust.

D. All construction operations shall be carefully coordinated with the EPA so as to minimize the overall inconvenience to the EPA and to expedite job progress.

E. Maintain public streets and roads adjacent to property utilized for construction traffic clear, clean and free from dirt and debris. Clean as required. Failure to clean will result in the EPA having it done at Contractor’s expense, plus fines.

1.04 - CONTRACTOR'S SAFETY RESPONSIBILITIES

A. It shall be understood that the Engineer's on-site observation of the work does not include review of the adequacy of the Contractor's safety measures in or near the construction area.

B. Compliance with all regulations pertaining to safety and health is the sole and complete responsibility of the Contractor.

C. Contractor shall comply with the requirements of all applicable Federal and State Legislation, EPA, Occupational Safety and Health Act (OSHA) Safety and Health standards (29CFR1910), and the specified safety requirements of the Industrial Commission of Ohio relating to Construction (Ohio Administrative Code: Chapter 4121:1-3).

D. When contracted work is being done in or around EPA buildings and grounds, the contractor shall protect EPA employees and equipment, and the general public from all construction hazards, and shall report all such hazards or suspected hazards to the EPA prior to commencement of contract work. Construction hazards shall include but not be limited to open excavations, falling objects, welding operations, dust, dirt and debris, and exposure to toxic and hazardous fumes and materials.

E. The Contractor shall make arrangements to legally dispose of all construction debris and hazardous materials. The Contractor shall be responsible for all off-site disposal of hazardous materials according to all federal, state, local, or EPA regulations. EPA's trash receptacles and sanitary drains shall not be used for the disposal of any materials.

F. When mechanized construction equipment is to be operated within EPA grounds, the contractor shall make arrangements for safety maintenance and control of traffic flow.

1.05 - SECURITY

A. Each Contractor shall assume full responsibility for protection and safety of material and equipment stored at the job site both within and outside the construction limits.

B. It shall be the responsibility of the Contractor to provide a safe and secure work site.

C. A secure work site shall be defined as one in which casual non-construction traffic (vehicular and pedestrian) is excluded from either entering in or passing through the site. It shall also include the effective securing of equipment, storage of materials and adequate lighting of the site.

D. Barricades, fences and guardrails shall be set-up and warning signs shall be posted where appropriate. ANSI Standard Z25.1 Specifications for Accident Prevention Signs shall be used to meet these specifications.

E. Lighting which is removed by the Contractor during construction must be replaced with adequate temporary lighting during the time of construction as determined by Engineer.

F. The Contractor shall provide the EPA with a list of contact persons, with telephone numbers, for 24 hour emergency contact.

G. Fumes and dust shall be controlled so as to prevent any harmful or undesirable effects to the surrounding areas.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01558 - INTERRUPTION TO SERVICES

PART 1 - GENERAL

1.01 - GENERAL

A. This Section specifies requirements relating to interruptions of services.

B. Accidental interruptions caused by the Contractor to services outside of the work area shall be reported to the EPA at once, and immediate emergency efforts to restore the service shall be made at the expense of the Contractor.

1.02 - PROTECTION OF EXISTING CONDITIONS

A. All portions of the existing structures, all utilities and all other elements not part of the work which are damaged, moved or altered in any way during construction shall be replaced or repaired to the EPA's satisfaction at the Contractor's expense.

1.03 - PLANNED INTERRUPTIONS TO SERVICE

A. All interruptions to Utility Services shall be planned by the contractor in coordination with the EPA, so as to provide the least inconvenience and downtime. A major utility shutdown will require a minimum of fourteen (14) calendar days notice from the Contractor.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01560 - RESTORATION OF PROJECT WORK AREA

PART 1 - GENERAL

1.01 - GENERAL

A. This Section includes requirements for restoration of site to pre-existing conditions.

B. Prior to completion of the Project, Contractor shall restore the project work area and items affected by new work to the condition which existed prior to the start of work. Only those new improvements indicated in the Contract Documents will be permitted to alter the appearance of the building surfaces after completion of work.

C. Prime Contractor shall be responsible for restoration of surface conditions within the construction limits.

D. All existing improvements if removed, destroyed or damaged during the course of work shall be repaired.

E. Related Section 02060 - REMOVAL, DEMOLITION, CUTTING AND PATCHING.

1.02 - CONTROL

A. Because extent of surface conditions which must be restored is dependent on the Contractor, extent of this work is not itemized in the Contract Documents. Contract Documents do, however, define typical items of work which shall be used in the replacement of those surface conditions which the Engineer anticipates will require replacement. If Contractor removes, destroys or damages an existing surface feature not anticipated to require replacement and the replacement work is not defined in the Contract Documents, Contractor shall inform the Engineer. The Engineer will develop and issue documents defining work to be performed in the replacement of said feature. Contractor shall perform this replacement work and all other replacement work at no additional cost to the EPA.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

A. Repair or replace all affected building components including wall, floor and ceiling finishes. Repair surfaces to nearest and logical termination point.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 - SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1. Provisions of this Section apply to the construction activities of each prime Contractor.

B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section 01310 - Progress Schedules.

1.02 - DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

a. "Named Products" or "Specified Standards" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside of the United States and its possessions; or produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of nor living within the United States and its possessions.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational parts,

whether motorized or manually operated, that requires service connections such as wiring or piping.

1.03 - SUBMITTALS

A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Engineer. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1. Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.

a. Related Specification Section number.
b. Generic name used in Contract Documents.
c. Proprietary name, model number and similar designations.
d. Manufacturer's and name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date, or time span of delivery period.

2. Initial Submittal: Within thirty (30) days after date of commencement of the Work, submit three (3) copies of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.

a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.

3. Completed Schedule: Within sixty (60) days after date of commencement of the Work, submit three (3) copies of the completed product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.

4. Engineer's Action: The Engineer will respond in writing to the Contractor within two (2) weeks of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. The Engineer's response will include the following:

a. A list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.04 - QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.
2. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Engineer will determine which products shall be retained and which are incompatible and must be replaced.

C. Foreign Product Limitations: Except under one (1) or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with the Contract Documents.
2. Domestic products that comply with Contract Document are only available at prices or terms that are substantially higher than foreign products that also comply with the Contract Documents.

D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
2. Equipment Nameplates; Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces.

1.05 - PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity with range required by manufacturer's instructions.
8. The EPA reserves the right to refuse to allow any material it considers to be a hazard to be stored on the EPA's property.
9. All storage areas shall be cleaned and restored to their properly completed condition.

PART 2 - PRODUCTS

2.01 - PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

1. Basis of Design: Where a product or manufacturer is named as the "Basis of Design," provide the product indicated, one of the other named "acceptable" products, or offer an unnamed equivalent product for consideration as substitution on the Substitution Sheet included in the Bidding Documents.

   a. Should the product upon which the Bid is based not be considered equivalent by the Engineer, the "Basis of Design" product shall be provided.
   b. Comply with provisions concerning "substitutions" to obtain approval for use of an unnamed product.

2. Descriptive Specification: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
3. Performance Specification: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

   a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

4. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
5. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.

a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.

6. Visual Selection: Where specified product requirements include the phrase"...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

PART 3 - EXECUTION

3.01 - INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 - SUMMARY

A. This Section specifies administrative and procedural requirements for contract closeout, including but not limited to:

1. Final Inspection procedures
2. Project Record Document submittal
3. Operating and Maintenance Manual submittal
4. Submittal of warranties
5. Final cleaning

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16. Applicable, inspections, tests, reports, certifications, etc., as required under the various sections of the specifications, such as listed below, but not limited to:

1. Section 16720 paragraphs 3.01 and 3.03 inspection and testing of the fire alarm system.

1.02 - DESCRIPTION OF REQUIREMENTS

A. DEFINITIONS: Closeout is hereby defined to include general requirements near end of Contract Time, in preparation for final acceptance, final payment, retainage payment, normal termination of contract, occupancy and similar actions evidencing completion of the work. Time of closeout is directly related to "Substantial Completion," and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been identified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions for this section.

1.03 - PROCEDURE

A. When the project is approaching substantial completion, the Contractor shall notify the EPA's On-Site Representative. The EPA's On-Site Representative will review the progress of the work to determine when

Substantial Completion is achieved. At that time, the EPA's On-Site Representative and the Engineer will prepare a punchlist of all items remaining to be completed and all items to be repaired to be acceptable to the EPA's On-Site Representative. The project will be closed out when the punchlist is 100% completed and approved.

COMPLETION TIME: The number of calendar days to complete all punchlist items is the time established by the Contractor and approved by the EPA to complete the majority of the items. All exceptions requiring more than 30 days will be listed with an extension of time and reason for the required extension of time to complete each particular item. If the Contractor fails to complete the items listed in the punchlist in 30 calendar days, the EPA may elect to have another Contractor to complete the work and deduct that cost from the original Contractor's final payment and retainage.

1.04 - PROJECT RECORD DOCUMENTS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

B. Each Prime Contractor will be furnished one set of Contract Drawings, Specifications, Addenda, Modifications and Supplementary Drawings which will be clearly marked "Project Record Documents". Blue line or black line drawings are mandatory; blueprints are not acceptable. These documents are not to be used for construction purposes.

1. Each of the above documents is to be maintained in good condition at all times, and available for inspection by the EPA at the project site.

C. Appropriate documents are to be marked by the Contractor to show:

1. All significant changes made during the construction process not covered by Supplementary Drawings or Modifications to the Specifications.
2. All significant details not shown in the original Contract Documents.

D. The information given should include:

1. Locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Locations of internal utilities and appurtenances concealed in the structures, referenced to visible features of the structures.
3. Clearly identify as to the exact routing of piping, conduit, and accessories. Indicate all installed conduit and wire routing, including conduit and wiring routed not indicated on construction documents.
4. A list of all substitutions which were made during the construction process, which might have been made, in accordance with the Contract Documents.

E. Keep the Project Record Documents current, do not permit any work to be concealed until the required information has been recorded.

F. Use red pencil or pen to note all changes in the Project Record Documents except the work recorded by the Engineer as being changed by Supplementary Drawings and Modifications to the Specifications.

G. Contractor shall inspect the Project Record Documents at intervals to verify that to the best of his knowledge all significant changes have been recorded.

H. Sub-contractors shall submit his Project Record Documents to the Prime Contractor at periodic intervals and just prior to Beneficial Completion. Contractor shall combine all Sub-contractor's records into one overall Project Record Document set for the entire Project, and shall submit the overall Project Record Documents to the Engineer for approval prior to application for Contract Completion. EPA may retain payment until advised by the Engineer of the receipt and approval of said documents.

I. In addition to the Project Record Documents, furnish to the EPA a complete list of all Subcontractors, together with a list of their respective material and equipment suppliers. The material and equipment suppliers list must list each product name and number together with the address of the company and name and address of the nearest representative. This list may be furnished as soon as all information is available to the Engineer, but it will not be accepted in a piecemeal fashion.

1.05 - OPERATION AND MAINTENANCE DATA

A. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Submit five (5) copies of the maintenance manuals. Include the following types of information:

1. Emergency instructions
2. Spare parts list
3. Copies of warranties
4. Wiring diagrams
5. Recommended "turn around" cycles
6. Inspection procedures
7. Shop Drawings and Product Data
8. Names, addresses and phone numbers of all subcontractors and material suppliers.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 - CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the EPA's Personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instructions by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals
2. Record documents
3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties and bonds
12. Maintenance agreements of similar continuing commitments

INSTRUCTION OF PERSONNEL IN USE OF SYSTEMS:

Prior to final acceptance of work by the EPA, the Contractor for systems requiring operating instructions, shall arrange a meeting with the EPA's On-Site Representative and designated representatives of the EPA to instruct personnel in use of the systems. "Instructions should include the proper, and safe operation of the fire alarm system." Each Contractor or subcontractor shall ascertain the system is fully operable and said demonstration shall not imply final acceptance by the EPA. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up
2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures

3.02 - FINAL CLEANING

A. General: General cleaning during construction is required and included in Section 01500 - TEMPORARY FACILITIES.

B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and antipollution regulations.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the EPA's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner. Do not use EPA's waste receptacles or sanitary system for disposing of waste from the project.

1. Where extra materials of value remaining after completion of Work have become the EPA's property, arrange for disposition of these materials as directed.

END

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01740 - WARRANTIES

PART 1 - GENERAL

A. Contractor to provide warranties of one (1) year minimum for all the work after acceptance, or as otherwise specified in each section of the specifications.

B. All warranties' time to start after FINAL acceptance of the WHOLE project by the EPA. Contractor shall extend manufacturer's warranty from initial equipment startup date to final acceptance by EPA at no additional cost to the EPA.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

A. Contractor to provide a certification of one year (1) warranty for all the work after FINAL acceptance of the WHOLE project by the EPA.

END

DIVISION 2 - SITE WORK

SECTION 02060 - REMOVAL, DEMOLITION, CUTTING AND PATCHING

PART 1 - GENERAL

1.01 - DESCRIPTION

A. For other requirements see General Conditions and General Requirements (Division 1).

B. SCOPE OF WORK

In general, the work shall include but not be limited to:

1. Uncover portions of the work to provide for installation of ill-timed work.
2. Remove and replace defective work or work not conforming to requirements of the Contract Documents.
3. Provide penetrations for installation of electrical work and similar items.
4. Penetrations in existing work by each Contractor, unless otherwise specified.
5. Each Sub-contractor to do his own cutting and removals except as otherwise specified.
6. Patching to be done by Contractor removing work and to be performed by a qualified tradesperson.
7. Erection of temporary fences and safety barriers as required, by Electric Contractor.
8. Protection of existing areas to remain occupied.
9. Removal of electric as required per Division 16.
10. Removal of any other appurtenances as required to complete the work.

Each Contractor or Subcontractor to do their own removal and demolition unless otherwise noted.

1.02 - BUILDING CODES AND INSPECTIONS

A. All work to comply with Ohio Building Code (O.B.C.).

B. See Division 1 for other requirements.

1.03 - COORDINATION

A. Contractors to coordinate all work with the EPA.

B. Coordinate all work with other Contractors.

1.04 - JOB CONDITIONS

A. Each Contractor or Subcontractor to visit site prior to bidding to determine job site conditions.

B. Erect barriers as required.

C. Post signs as required to direct traffic.

D. Preserve fire exits of building during construction, if building occupied.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 - PREPARATION

A. Inspect existing conditions of the project, including elements subject to damage or to movement during cutting and patching.

B. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.

C. Provide devices and methods to protect other portions of the project from damage.

D. Provide protection from the elements for that portion of the project which may be exposed to weather by removals, cutting and patching work.

E. Provide dust covers, etc., as required and as directed by the EPA's On-Site Representative to limit the accumulation of dust, dirt and debris in adjacent areas to the cutting and patching work, when in occupied buildings, by Electric Contractor.

3.02 - PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

B. Employ skilled workpersons to perform selective cutting and patching for:

1. Sight-exposed finished surfaces.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

D. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.

E. Fit work airtight to conduit and other penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.
2. For an assembly, refinish the entire unit.

G. Notify the EPA immediately if any active utilities are uncovered during the progress of the work.

H. Remove all finishes carefully, turn over to the EPA the salvage material for storage.

I. Prepare surfaces for finishing.

J. Where new work requires cutting and patching of existing conditions, patch adjacent areas and interface new work with existing to provide a finished construction of like materials, finishes, quality and function at the existing conditions. Make all repairs and patches, fillings, etc., to the satisfaction of the EPA's On-Site Representative. The Contractor shall hire a Subcontractor of the trade involved to perform the work.

K. Remove rubbish from job site by Division 1, General Requirements.

L. Contractor to reinstall all other work temporarily removed to perform this work. Contractor to hire a Subcontractor of the trade involved to perform the work.

M. As required to complete the work: Remove, store, safeguard, and reinstall acoustical tile ceiling. Patch existing ceiling suspension and replace tiles damaged during construction. Provide materials to match existing.

N. Provide all finish plastering and accessories required for patching of existing plaster work affected by new construction. Provide materials and finish to match existing.

O. Patch all existing drywall work affected by new construction. Provide materials and finish to match existing.

P. Patch all existing concrete work affected by new construction. Provide materials and finish to match existing.

END

DIVISION 5 - METALS

SECTION 05125 - MISCELLANEOUS FASTENERS

PART 1 - GENERAL

1.01 - DESCRIPTION

A. For other requirements see General Conditions and General Requirements (Division 1).

B. SCOPE OF WORK

Fasteners for miscellaneous work.
Washers.

1.02 - QUALITY CONTROL

A. Manufacturer's load test standard procedures.

1.03 - REFERENCE STANDARDS

1. Federal Specifications FF-S-111 for bolt anchors.
2. GSA Specifications FF-B-488C #3.3 for toggle bolts.
3. FS FF-W-92 for metal washers.
4. FS FF-W-84 for lock washers.
5. ASTM B633, SC1, Type III for safety sleeve anchors.

1.04 - BUILDING CODES AND INSPECTIONS

A. All work to comply with Ohio Building Code (O.B.C.).

1.05 - COORDINATION

A. Contractor to coordinate location of fasteners with other trades as required.

1.06 - TESTING

A. Copies of tests required only when requested.

1.07 - JOB CONDITIONS

A. Contractor to verify substrate condition in the field for proper selection.

1.08 - PRODUCT DELIVERY, STORAGE AND HANDLING

A. All anchors to be delivered in sealed packages. All

packages to be labeled by manufacturer.

1.09 - SUBMITTALS

A. Submit manufacturer's certifications of loads.

B. Submit manufacturer's data and application instructions.

C. Contractor to keep set of installation instructions at job site.

PART 2 - MATERIALS

2.01 - GENERAL

A. Non-ferrous metal or hot-dip galvanized for exterior installations and as required for corrosion resistance.

B. All fasteners to be compatible with other metals.

C. All heads to be "Phillips" type and countersunked when exposed in finished areas, unless otherwise noted or shown.

D. Comply with fire ratings when used in fire rated walls or partitions.

2.02 - MASONRY FASTENERS

A. "Tapcon" fasteners by "Buildex" or approved equal. 3/16" diameter or 1/4" diameter, as required for loads. 1" to 1-3/4" minimum penetration in solid concrete block or brick. Minimum withholding power of 800# and 700# in shear. To comply with FS FF-S-111.

B. TOGGLE BOLTS
Tumble-wing type, complying with GSA Specifications FF-B-488C #3.3, "SUP-R-Toggles" (Loktite #10) by "USE Diamond" or approved equal, with minimum withholding power of 1,000 pounds.

C. "Hilti" sleeve anchor #HX 1/2" diameter x 2-1/4" with 1-1/2" penetration. Minimum working loads to be 500 pounds pull-out and 500 pounds shear. Equal manufacturers to be approved by EPA's On-Site Representative.

2.03 - MOLLEY ANCHORS

A. Not allowed.

2.04 - CONCRETE FASTENERS

A. 1/4" diameter, "Blue Max" system by "Buildex" or equal approved. 2" minimum penetration in concrete. Minimum of 1,000 pounds withholding power and 1,500 pounds in shear. To comply with FS FF-S-111.

2.05 - PLAIN WASHERS

A. Round, general assembly grade galvanized carbon steel, complying with FS FF-W-92.

2.06 - LOCK WASHERS

A. Helical spring type, galvanized carbon steel, complying with FS FF-W-84.

2.07 - DRYWALL FASTENERS

A. FOR METAL SUBSTRATE
To comply with ASTM C646-78 Specifications. "Hi-low" type S bugle head drywall screws by "Buildex" or equal (7 x 1-1/4" minimum size).

B. FOR WOOD SUBSTRATE
To comply with ASTM C646-78 specs. "Hi-low" type W bugle head screws by "Buildex" or equal (7 x 1-1/4" minimum size).

2.08 - CONCRETE SAFETY BOLTS

A. "HSL" expansion anchor, heavy duty sleeve type, zinc plated per ASTM B633, SC1, Type III, by "Hilti" Fastening Systems or equal to be approved by the Engineer. 5500# tensile strength minimum and 8000# shear strength minimum.

PART 3 - INSTALLATION

3.01 -

All fasteners to be installed per manufacturer's instructions. Contractor to keep at job site one (1) copy available for EPA's On-Site Representative.

3.02 -

Use fasteners of required type, size and thickness to produce adequate strength and durability. Work to be true and level

with accurate angles, straight and tight in place.

3.03 -

Pre-drill for all fasteners with proper bit size to guarantee required loads specified in PART 2.

3.04 -

Provide fasteners long enough to provide minimum penetration specified in PART 2.

3.05 -

The use of impact power tools is not allowed to install fasteners.

3.06 -

Clean-up all leftover materials and debris after completion of the work.

3.07 - GUARANTEE

One (1) year after FINAL acceptance of the WHOLE project by the Owner.

END

DIVISION 7 - THERMAL/MOISTURE PROTECTION

SECTION 07270 - FIRESTOPPING

PART 1 - GENERAL

1.01 - DESCRIPTION

A. For other requirements see General Conditions, Supplementary General Conditions, and General Requirements (Division 1).

B. SCOPE OF WORK

1. Firestop all penetrations through fire-rated walls and fire-rated partitions.
2. Firestop all penetrations through smoke partitions.
3. Firestop all pipe penetrations through all floor and roof assemblies.
4. All other penetrations in non-rated walls to be calked tight.

1.02 - QUALITY CONTROL

A. Manufacturer to be experienced for not less than three (3) years in the production of firestopping materials and to be certified by 'UL'.

B. Installer to be experienced for not less than five (5) years and be certified installer by manufacturer.

1.03 - REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) Publications:

E 84 Surface Burning Characteristics of Building Materials

E 119 Fire Tests of Building Construction and Materials

E 814 Fire Tests of Through-Penetration Firestops

B. Underwriter Laboratory (UL):

UL-1479 Fire Test of Through-Penetration Firestops

C. National Fire Protection Association (NFPA) Standard:

N.F.P.A. 251, Latest Edition.

1.04 - BUILDING CODES AND INSPECTIONS

A. Work to comply with Ohio Building Code (O.B.C.) and Local codes.

B. Work to be inspected by Building Officials as required before covering the work.

1.05 - COORDINATION

A. Coordinate the work with other trades.

1.06 - TESTING

A. Submit copies of 'UL' test results for verification of products' performance.

1.07 - JOB CONDITIONS

A. Contractor to verify field conditions as required.

1.08 - PRODUCT DELIVERY, HANDLING AND STORAGE

A. Products to be delivered to job site in manufacturer's containers, properly labeled.

B. Storage in dry place and properly protected from the weather, per manufacturer's requirements.

1.09 - SUBMITTALS

A. Submit manufacturer's instructions for applying sealant. Submit schedule of all 'UL' tested systems to be used.

B. Submit manufacturer's certifications that materials meet or exceed specified requirements.

C. Provide certification stating that sealant has been completed in full accordance with requirements to provide necessary fire-resistance ratings.

D. Provide copies of certified test reports:

1. Fire test reports of sealant application to substrate materials similar to project conditions.
2. Reports from reputable independent testing agencies of product proposed for use, which indicate conformance to ASTM E-814.

E. Submit manufacturer's details for each type proposed.

PART 2 - PRODUCTS

2.01 - MATERIALS

A. SEALANTS FOR FIRESTOPPING

Materials shall be asbestos free and be 'UL' labeled.

Flame Spread 25 or less and Smoke Develop 50 or less, per ASTM E-84 test.

Fire Resistance and Hose Stream Tests: To be rated "F" and "T" per ASTM E814 or 'UL' 1479.

B. BLANKETS FOR FIRESTOPPING

Materials to be inorganic, with a melting point of 3200°F minimum.

Flame Spread 25 or less and Smoke Develop 50 or less, per ASTM E-84 tests.

C. RETENTION CLIPS

As recommended by manufacturer to support blankets' or sealants' firestopping in place without displacement.

2.02 - ACCEPTABLE PRODUCTS/MANUFACTURERS

A. SEALANT FIRESTOPPING

1. Fyre Putty by Carborundum
2. 3M-Fire Barrier Caulk CP25, N/S or SL
3. #2000 Fire Stop, by Dow Corning Company
4. Pensil 100/200 by G.E.

B. BLANKET FIRESTOPPING

1. 'Fiberfax' by Carborundum Co.
2. 'Thermafiber' by USG Industries, Inc.

PART 3 - EXECUTION

3.01 - ENVIRONMENTAL REQUIREMENTS

A. Do not apply sealants when temperature of substrate material and surrounding air is below 40°F.

B. Maintain sealant at a minimum 70°F for best workability

C. Maintain all products dry at all times.

3.02 - EXAMINATION

A. Confirm compatibility of surfaces to receive sealant materials.

B. Verify that surfaces of openings are sound, clean, dry and ready to receive application of sealants.

C. Verify that penetration elements are securely fixed and properly located, with a minimum of 1/2 inch space between penetrations and surfaces of openings.

3.03 - PREPARATION

A. Protect adjacent surfaces and equipment from damage.

B. Clean contact surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of sealant.

C. Remove incompatible materials which affect bond by scraping, brushing, scrubbing or sandblasting.

3.04 - APPLICATION

A. Apply sealant in strict accordance with manufacturer's instructions.

B. Apply sealant in sufficient thickness to achieve required rating.

C. Pack sealant material solidly around penetrations, fill openings to a depth as required to obtain required fire-rating.

D. Pack blanket firestopping solidly in gaps to be firestopped. Blanket to be secured in place by clips, not by friction action.

E. Contractor to have a copy of application instructions at job site for EPA's On-Site Representative's use.

3.05 - CLEAN-UP

A. Remove from job site all material leftovers, tools, etc. at the completion of the work.

B. Remove sealant from materials and surfaces not specifically required to be sealed.

END

DIVISION 7 - THERMAL/MOISTURE PROTECTION

SECTION 07920 - SEALANTS AND CALKING

PART 1 - GENERAL

1.01 - DESCRIPTION

A. For other requirements see General Conditions, Supplementary General Conditions, and General Requirements (Division 1).

B. SCOPE OF WORK
Provide colored silicone sealant and backing materials where required to seal joints between different materials. Work includes but is not limited to, sealing joints in new penetrations at existing walls.

1.02 - QUALITY CONTROL

A. QUALIFICATIONS
Installer must be experienced in the installation of sealants for not less than five (5) years. Must be approved by EPA's On-Site Representative and sealant manufacturer.

B. Manufacturer to submit copies of testing reports by independent laboratory if required by EPA's On-Site Representative.

1.03 - REFERENCE STANDARDS

The following publications of the issues listed below, but referred to hereinafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

A. FEDERAL SPECIFICATIONS (FS)

TT-S-00227E(3) Sealing Compound: Elastomeric Type, Multi-Components (For Calking, Sealing, and Glazing in Buildings and Other Structures).

TT-S-00230C(2) Sealing Compound: Elastomeric Type, Single Component (For Calking, Sealing, and Glazing in Buildings and Other Structures).

1.04 - BUILDING CODES AND INSPECTIONS

A. To follow Ohio Building Code (O.B.C.) requirements.

B. To comply with 'UL' U900D requirements when in fire-rated walls or partitions.

1.05 - COORDINATION

A. Contractor to schedule the work with all Contractors, the EPA and others affected by this work.

1.06 - TESTING

A. Contractor to do field adhesion testing to substrate if required by EPA's On-Site Representative or Engineer.

1.07 - JOB CONDITIONS

A. ENVIRONMENTAL CONDITIONS
Performance of joint sealing work is subject to the more stringent of the following environmental conditions and manufacturer's recommendations.

1. Temperature: Perform all work within temperature range of 40 and 85 degrees F.
2. Moisture: Do not work when moisture is present or when surfaces to be sealed are wet.

1.08 - DELIVERY, STORAGE & HANDLING

A. Deliver materials to site in original sealed and labeled containers bearing manufacturer's name, brand name, date of manufacture and color designation.

B. Store materials in a well ventilated space maintained at temperatures below 75 degrees F unless stricter controls required by manufacturer.

1.09 - SUBMITTALS

A. SAMPLES
Submit samples of each color and type of sealant proposed for use on the Work; obtain approval by EPA's On-Site Representative before proceeding.

B. PRODUCT DATA
Submit copies of tests and other product data verifying conformance with specified performance characteristics.

C. COLOR
EPA’s On-Site Representative to select colors. Color to match adjacent surface colors, unless otherwise required.

PART 2 - PRODUCTS

2.01 - MATERIALS

A. CALKING
One-component acrylic-latex non-staining, non-bleeding compound, for interior application above grade, to comply with ASTM C834, suitable for painting.

1. PRODUCTS ACCEPTABLE
Sonolac by Sonneborn.
Pecora AC-20 by Pecora Chemical.

B. ACOUSTICAL CALKING
"Tremco" acoustical sealant to be used in all acoustical insulated partitions and ceilings.

C. OTHER JOINT SEALING MATERIALS
Provide the following accessory joint sealant materials:

1. PRIMER
Provide primer material made or recommended by the sealant manufacturer for the conditions and substrates of the application.

2. BACKING MATERIAL

a. Expanded closed cell polyethylene; not less than 2 pcf, 20 psi minimum tensile strength; size maximum 25% larger than width of joint. Provide rod or slab forms as indicated on drawings.
b. "Denver Foam" by Backer Rod Manufacturing and Supply Company, Denver, Colorado, or approved equal. Open cell polyurethane foam; non-gassing; non-staining; 6 pcf maximum density; size minimum 25 % and maximum 75 % larger than joint-size.

PART 3 - EXECUTION

3.01 - PREPARATION

A. Obtain manufacturer's instructions for sealant installation.

B. INSPECTION
Installer must examine substrate and conditions under which sealant work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions

have been corrected in manner acceptable to installer.

3.02 - INSTALLATION

A. GENERAL
Mix and apply sealant materials in strict accordance with manufacturer's instructions and approved shop drawings.

B. PREPARATION
Clean joint surfaces free from dirt, dust and any other contaminants affecting bond of the sealant material.

1. PRIMING
Apply primer to contact surfaces as recommended by sealant manufacturer.

2. BACKING
Provide backing materials in as long lengths as practicable; install with proper tool, forcing backing into joint to proper depth for sealant.

a. Provide open-cell type backing at all vertical or face joints above grade.
b. Provide closed-cell type backing at all horizontal or paving joints and all joints below grade.

C. APPLICATION
Apply sealant over backing to uniform thickness in continuous beads, filling all joints and voids solid; superficial pointing with skim bead will not be accepted. After application, tool surface to achieve complete adhesion and contact; leave surface of sealant slightly concave. Provide bond breaking between backer rod and sealant as required by sealant manufacturer. Mask adjacent surfaces as required.

D. ACOUSTICAL SEALANTS
Contractor to calk around all penetrations through all acoustical partitions or ceilings and around all conduit, electrical boxes, etc.

3.03 - CLEAN-UP

A. Upon completion, remove and dispose of masking materials; remove all excess sealing materials; clean adjacent surfaces of all soil and stain resulting from sealing operations.

B. Contractor to remove materials leftover, tools, scaffolding, etc. from property after completion of the work.

C. Contractor to clean all spillage of materials over ALL adjacent surfaces to the satisfaction of the EPA's On-Site Representative and Engineer.

3.04 - GUARANTEE

A. 20 years minimum after FINAL acceptance of the WHOLE project by the EPA.

B. Guarantee to cover labor and materials, including any additional work required to correct the work.

END

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 - DESCRIPTION

A. For other requirements see General Conditions, Supplementary General Conditions, and General Requirements (Division 1).

B. SCOPE OF WORK
Provide paint and finish for all exposed surfaces of project except those specifically excluded. Work includes, but not necessarily limited to, the following:

1. All existing surfaces damaged or affected by new construction to match existing as required.
2. All exposed electrical items including equipment, conduit and raceway when exposed in finished rooms. Finish to match adjacent finish.
3. Paint all items noted or as required herein in conjunction with listed alternates.

C. A complete schedule of colors and finishes will be furnished by the EPA's On-Site Representative.

1.02 - QUALITY ASSURANCE

A. Applicator to be approved by the EPA's On-Site Representative and shall, upon request, furnish in writing his qualifications attesting to past satisfactory experience in painting and finishing work of not less than the scope of this project.

1. Applicator must employ qualified personnel.
2. Materials to be approved by the EPA's On-Site Representative.
3. Follow manufacturer's recommendation for temperature and humidity conditions during application.
4. Follow manufacturer's recommendations on thinning for application method used.
5. Work all coats into an even film. Eliminate holidays, laps, brush marks, runs, sags or other surface imperfections. Neatly draw any lines called for.

B. Refinish any work judged defective by the EPA’s On-Site Representative or the Engineer at no additional cost to the EPA.

1.03 - REFERENCE STANDARDS

OSHA-ANSI standards 2-53, 1-1979
SSPC-SP1
SSPC-SP2
SSPC-SP3
Fed. Spec. TT-E-489G
Fed. Spec. TT-E-506K
Fed. Spec. TT-E-508C
Fed. Spec. TT-E-545C
Fed. Spec. TT-P-30E
Fed. Spec. TT-P-636C
Fed. Spec. TT-P-650B
Fed. Spec. TT-P-1511B

1.04 - BUILDING CODES AND INSPECTIONS

A. All paint materials and application to comply with Ohio Building Code (O.B.C.) requirements for fire ratings, flame spread and smoke contribution. Application procedures to comply with requirements of Division 1.

1.05 - COORDINATION

A. Verify compatibility of paint materials with primers by others or with existing paints.

1.06 - JOB CONDITIONS

A. Comply with manufacturer's recommendations as to environmental conditions under which coatings can be applied. Do not apply finish in areas where dust or moisture is being generated.

B. Do not proceed with work over unsatisfactory surfaces. If so, this Contractor will assume the responsibility without additional compensation.

C. Protect surfaces not to be coated.

D. Adequate illumination and ventilation.

1.07 - PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original sealed and labeled containers bearing manufacturer's name, brand name, type of material, color designation, and instructions for mixing and thinning.

B. Store materials in a well ventilated space maintained at a minimum of 45 degrees F. Take all precautions to prevent fire.

1.08 - SUBMITTALS AND SAMPLES

A. Submit three (3) copies of manufacturer's specifications for approval for each type of paint.

B. Submit three (3) copies of complete color charts for color selections.

PART 2 - PRODUCTS

2.01 - MATERIALS

A. Select primary products of the coating system from the products of a single manufacturer.

B. Secondary products not specified by name (turpentine, thinners, mineral spirits, fillers, linseed oils, etc.) shall be "best grade" or "first line" products.

C. DO NOT USE ANY PAINT WITH LEAD, ASBESTOS, AND MERCURIAL FUNGICIDES.

2.02 - PAINT AND COATING SCHEDULE

A. GENERAL

1. Apply the following finishes to prepared surfaces as scheduled or as specified.

   a. Perry & Derrick.
   b. Porter, Pratt & Lambert, Sherwin Williams will be other acceptable manufacturer.

2. The following treatment (as applicable) shall be applied to surfaces as indicated on finish schedule and details of drawings. Prime coat specified below will not be required on items delivered with prime or shop coats already applied.

B. INTERIOR FERROUS METALS

ALKYD ENAMEL:

FIRST COAT: Interior Trim Primer

SECOND COAT: Premium Satin Oil Enamel

THIRD COAT: Premium Satin Oil Enamel

PART 3 - EXECUTION

3.01 - SURFACE PREPARATION

This section applies to both interior and exterior painting.

A. GENERAL

1. It is the intention of this section that new substrates be ready for decoration as specified herein except for normal construction dust and soiling.
2. New surfaces installed by other trades are required to be acceptable for work under this section which may include work specified under Part 3, SURFACE PREPARATION. Specifically new surfaces to be clean, sound, free from loose particles, dirt, loose mortar, grease, etc.
3. Existing surfaces, unless otherwise specified, to include under this section all surface preparation required for decoration. Verify compatibility of existing paint with new coatings if not required to be removed.
4. Perform preparation and cleaning procedures in accordance with manufacturer's instructions.
5. Clean surfaces before applying paint. Provide cleaning solvents of low toxicity and flash point in excess of 100 degrees F. Program cleaning and painting so dust and other contaminants will not fall on newly painted surfaces.

3.02 - APPLICATION

A. GENERAL

1. Mix and prepare painting materials in accordance with manufacturer's directions.
2. Do not mix materials of different manufacturers, unless otherwise specified.
3. Apply coats or treatments using 'highest' quality workmanship by skilled craftsmen.
4. PROTECTION

   Protect work of other trades. Leave all work undamaged, with any damage corrected by cleaning, repairing or repainting as directed by EPA's On-Site Representative.

   Take precautions to ensure workmen, building occupants and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

5. CLEAN-UP
   During progress of work, remove all discarded paint materials rubbish, cans and rags.

6. PAINT APPLICATION
   Apply paint by brush or roller only in accordance with manufacturer's directions. Spraying will not be acceptable.

   Number of coats and film thickness is same regardless of application method. Do not apply succeeding coats until previous coat has completely dried. Sand between coats, in accordance with manufacturer's directions. Allow a minimum of 24 hours between coats under proper drying conditions.

   Apply additional coats as necessary until film has uniform finish, color and appearance.

   Touch-up of paint finish coat is not acceptable. Paint whole surface to corners or other inconspicuous termination point. Color to match.

   Stir coatings thoroughly and maintain uniform consistency during application.

   Spread materials evenly, with no runs, sags, laps, brush marks, variation in color, or holidays.

   Cut sharp lines against glass, other materials, and different colors.

   Paint surfaces behind moveable equipment, furniture and back sides of access panels, removable or hinged.

7. THINNERS
   Thin no coating more than specifically recommended by manufacturer.

   a. Use thinner of recommended type, only if approved by EPA's On-Site Representative.
   b. Do not thin ready-prepared coating and add no driers.

B. APPLICATION RESTRICTIONS

Do interior work only when building is thoroughly dry, and area of work is properly ventilated and as clean and dust-free as possible.

Paint applications to be done ONLY when coordinated with the EPA and when providing PROPER ventilation. Coordinate with the EPA when painting interferes with operations or when odors and fumes are hazardous.

Do not apply any additional coats or paint until the preceding coat gets the EPA's On-Site Representative's approval.

Paint to match existing painted surfaces to be extended to inconspicuous termination point, like room corners, pilaster corners, ceiling beams or any other surface off-set corners, ceiling beams or any other surface off-set or projection. Match color, texture and shim of existing paint.

Remove, refinish or repaint work not in compliance with requirements and specifications or not matching colors, textures or coverages.

Provide masking as required if spraying allowed.

C. MINIMUM COATING THICKNESS
Apply each material at not less than manufacturer's recommended spreading rate. New surfaces to have primer and two (2) coats of paint.

D. PRIME COATS
Apply prime coat to materials required to be painted or finished. Omit prime coat on metal surfaces which have been shop-primed and touched-up.

E. BRUSH APPLICATIONS
Brush-out and work all coats into an even film. Surface imperfections not acceptable. Neatly draw all lines called for.

F. MECHANICAL APPLICATIONS
By roller only when possible.

3.03 - CLEAN-UP

Remove all tools, trash, equipment, etc. after completion of work.

Clean ALL other surface spilled with paint. See Division 1 for requirements.

DIVISION 16 - ELECTRICAL

SECTION 16010 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 - REFERENCE

A. The General Conditions, Special Conditions, Division 1 through Division 9 as set forth in the foregoing pages are hereby incorporated into and shall become a part of the Specifications for work under this title, insofar as they apply hereto.

B. All Specifications used for this project are directed to and are the responsibility of the Electrical Contractor. This Contractor shall be responsible of any electrical work required by other Drawings or Specification Divisions.

1.02 - CONTRACT DOCUMENTS

A. The Drawings and these Specifications are complementary each to the other and what is called for by one shall be as if called for by both.

B. Consult all Contract Documents which may affect the location of equipment, conduit and wiring and make minor adjustments in location to secure coordination.

C. Wiring layout is schematic and exact locations shall be determined by structural and other conditions.

D. Coordinate layout of work with other trades. Make minor adjustments in location required for coordination.

E. The location of fire alarm devices shown on the Drawings is approximate, and the EPA's On-Site Representative shall have the right to relocate any fire alarm devices before they are installed without additional cost.

1.03 - BUILDING CODES

All work to follow:

A. Ohio Building Code

B. National Electrical Code

C. 'UL' Requirements

D. Life Safety Code

E. National Fire Protection Association

F. American Disabilities Act

G. EPA Regulations

1.04 - MANUFACTURER'S DRAWINGS

A. See Division 1 for requirements of Shop Drawings, Product Data and Samples.

B. Submit to the Engineer, for review, copies of Manufacturer's Data and Drawings for the following items:

ITEMS	TYPE SUBMITTALS REQUIRED
Fire Alarm Devices	Catalog Cuts
Fire Alarm System	System Layout, Riser Diagram and Calculations

C. Engineer's review of Manufacturer's Drawings or Schedules shall not relieve the Contractor from responsibility for errors or omissions in Manufacturer's Drawings or schedules and deviation from Drawings or Specifications.

1.05 - JOB-SITE COPY OF DOCUMENTS

A. Maintain at the site, one (1) copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications, in good order. These shall be available to the EPA's On-Site Representative.

PART 2 - PRODUCTS

2.01 - MATERIALS

A. All materials shall be new and undeteriorated and of a quality not less than the minimum specified.

B. Materials and equipment for which there are Underwriters' Laboratories Standard requirements, listing and labels, shall have listing of Underwriters' Laboratories and be so labeled.

PART 3 - EXECUTION

3.01 - INSTALLATION

A. Furnish and install all necessary hangers, supports, straps, boxes, fittings and other similar appurtenances not indicated on the Drawings but which are required for a complete and properly installed system.

B. Clearances, when possible, shall be greater than those required by code.

C. Working Clearances: At least 6'-3" clear headroom must be maintained in front of all electrical equipment. Provide at least 3'-0" clear space in front of all electrical equipment as wide as the equipment with a minimum of 2'-6" wide.

3.02 - WORKMANSHIP

A. Electrical work shall meet or exceed the standards of installation and workmanship set forth in the latest edition of the National Electrical Contractors Association publication entitled NECA STANDARD OF INSTALLATION, except as otherwise modified in these Specifications or shown on the Drawings.

B. The EPA's On-Site Representative reserves the right to direct the removal and replacement of any item which, in his opinion, does not present an orderly, neat or workmanlike appearance, provided that such item can be properly installed in an orderly way by methods usual in such work, or which does not comply with the contract drawings or these Specifications. Perform such removals or replacements when directed in writing by the EPA's On-Site Representative and at the Contractor's expense.

C. The Electrical Contractor, insofar as the work is concerned, shall at all times keep the premises in a neat and orderly condition, and at the completion of the work shall properly clean up and haul away debris and excess materials.

3.03 - PROTECTION AND DAMAGE

A. In addition to the provisions and stipulation of the General Conditions, each contractor and subcontractor shall provide various types of protection as follows:

1. Protect finished floors from chips and cutting oil by the use of metal drip receiving pan and oil proof floor cover.
2. Protect equipment and finished surfaces from welding and cutting splatters with baffles and splatter blankets.
3. Protect equipment and finished surfaces from paint droppings, insulation adhesive and sizing droppings, etc. by use of drop cloths.

B. All equipment shall be stored at the site with openings, bearings, etc., covered to exclude dust and moisture. All stockpiled pipe shall be placed on dunnage and protected from weather and from entry of foreign material.

C. Conduit and construction openings and excavations required for Electric work shall be covered when work is not in progress as follows:

1. Cap pipe openings with fittings or plugs.
2. Cover wall and ceiling openings with plywood, or canvas covered framing.
3. Cover floor openings and excavations with structural material of adequate strength to support traffic.

D. The EPA's property and the property of other Contractors shall be scrupulously respected at all times (including damage from leaks). Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent area.

E. Contractor shall be held responsible for damage caused by his work or through neglect of his workmen. Repairing of damaged work shall be done by Contractor as directed by the EPA's On-Site Representative or the Engineer. Cost of repairs shall be paid by Contractor.

F. The EPA reserves the right to make emergency repairs as required to keep equipment in operation without voiding the Contractor's guarantee bond not relieving the contractor of his responsibilities during the bonding period.

END

DIVISION 16 - ELECTRICAL

SECTION 16020 - SCOPE OF WORK

PART 1 - GENERAL

1.01 - SCOPE

A. Furnish all materials, labor, tools, transportation, incidentals and appurtenances to complete in every detail and leave in working order all items of work called for herein and shown on the accompanying Drawings.

B. It is the intent that the ensuing work shall be complete in every respect and that any material or work not specifically mentioned or shown on the Drawings, but necessary to fully complete the work, shall be furnished.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 - SITE VISITATION

A. The Bidder is required to visit the site and fully inform himself concerning all conditions affecting the scope of the work. Failure to visit the site shall not relieve him from any responsibility in the performance of this Contract.

3.02 - SUPERVISION OF WORK

A. Foreman shall be in charge of the work, at all times during construction.

B. Refer to the Specifications covering all branches of the work and keep fully informed of the progress of the general construction.

3.03 - TEMPORARY SERVICE

A. For temporary service and lighting see Division 1.

3.04 - EXISTING WORK AND DEMOLITION

A. See Division 2.

B. Locate existing utilities prior to beginning work. Reroute or replace existing utilities where necessary to permit installation of the work. Provide adequate means of protection during work operations. Repair existing

utilities damaged during work operations to the satisfaction of the utility owner and at Contractor's expense.

C. Should uncharted or incorrectly charted piping or other utilities be encountered during work operations, notify the EPA's On-Site Representative immediately for procedure directions. Cooperate with utility companies in maintaining active services and facilities in operation.

D. Verify and repair existing wiring as indicated or required. Existing work which remains shall be left in first class condition and properly reconnected.

E. Branch circuit wiring and conduit from removed electrical work shall be removed back to the source.

F. Reuse existing conduit and boxes when possible. All unused boxes shall be blanked-off. All new conduit and wire in remodeled areas shall be run concealed, except overhead when no ceilings or in surface metal raceway to surface mounted devices.

3.05 - CUTTING AND PATCHING

A. See Division 2, "Cutting and Patching".

B. Cutting and patching in existing work shall be at this Contractor's expense.

C. All cutting through poured concrete slabs and walls shall be done with core drills. No jack hammers will be allowed.

3.06 - CLEANING AND PAINTING

A. All electrical equipment shall be kept dry and clean during the construction period.

B. Prime and paint by this Contractor’s Painting Subcontractor.

C. When all work is completed and all work has been satisfactorily tested and accepted by the EPA’s On-Site Representative, all fixtures, conduit and other exposed surfaces shall be thoroughly cleaned.

3.07 - INTERRUPTION OF SERVICE AND OWNER'S OPERATION

A. The Electrical Contractor shall organize his work so that these alterations and additions shall cause a minimum of interference and disturbance to the EPA. Arrangements

shall be made person to person with the EPA's On-Site Representative at least fourteen (14) days in advance BEFORE INTERRUPTING SERVICE IN ANY AREA).

3.08 - RESUME' OF ELECTRIC WORK

The work to include, but not limited to:

A. Removals, including, but not limited to, all fire alarm and civil defense devices and associated conduit and wiring, not used in final arrangement.

B. New Conduit and Boxes

C. New Wiring

D. New Fire Alarm System

E. New Cover plates

F. Painting: Wall, floor or ceiling repair, etc.

G. DDC work

3.09 - SCHEDULING

A. All work will be performed in an existing facility that will be occupied. With the exception of tie-ins and equipment testing and demonstration, all work shall be performed during normal working hours. All tie-ins and equipment testing and demonstration shall be performed between the hours of 6:00 p.m. and 6:00 a.m. Monday through Friday, or anytime Saturday, Sunday or federal holidays.

END

DIVISION 16 - ELECTRICAL

SECTION 16030 - TESTS AND INSPECTIONS

PART 1 - GENERAL

1.01 - TESTS

A. When the EPA's On-Site Representative makes final inspection of all electrical work he will order tests performed as deemed necessary. This Contractor shall provide such assistance as required (including manpower and tools) to start and stop the various systems. The Contractor (not the EPA's On-Site Representative) is responsible to turn on the systems and demonstrate they are operating properly.

B. All testing and demonstrations shall be performed during EPA non-working hours.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 - PERFORMANCE

A. Contractor, Subcontractor, vendors, or manufacturer shall provide tests on the following equipment. Refer to the appropriate specification section for description of the tests.

1. Operation of all electrical and fire alarm systems. Correct operation of each fire alarm device shall be demonstrated to the Engineer and the EPA’s On-Site Representative.
2. Grounding of fixtures and electric systems.

END

DIVISION 16 - ELECTRICAL

SECTION 16111 - CONDUITS

PART 1 - GENERAL

1.01 - SCOPE

A. Furnish and install all conduits, raceway, boxes, fittings, etc., for a complete raceway system.

B. See Section 16130 - BOXES AND PLATES.

C. All fire alarm wiring shall be installed in raceways.

PART 2 - PRODUCTS

2.01 - CONDUIT - RIGID METAL

A. Branch circuits shall be in thin- wall (EMT) conduit.

B. Minimum size of metal conduit to be 3/4" diameter, unless otherwise required.

2.02 - CONDUIT - FLEXIBLE

A. Conduit within existing walls or above drywall ceilings may be short lengths of flexible conduit with green ground wire.

B. Minimum size shall be 3/4" trade size. Maximum length 6'-0".

2.03 - CONDUIT - ABOVE GROUND EXTERIOR

A. Conduit and fittings for above ground exterior use shall be aluminum rigid conduit.

2.04 - CONDUIT - PVC

A. Conduits and fittings for underground use shall be in Schedule 40 PVC Rigid Conduit. Minimum size of conduit to be 3/4" diameter. Provide rigid metal elbows at floor line or grade.

2.05 - CONDUIT FITTINGS

A. All thinwall connectors shall be of the concrete tight, insulated throat, compression type, similar to Thomas and Betts No. 5223. All fittings shall be steel. Contractor may use Thomas and Betts, Raco, Steel City or Midwest fittings. Pressure cast pot metal, indenter fittings, die cast or set screw fittings shall not be accepted.

B. Rigid conduit fittings shall be cast, threaded, watertight type. Fittings shall be cadmium or zinc plated.

2.06 - FIRESTOPPING (SAFING)

A. 3M firestop barrier calk CP25.

B. #2000 firestop, by Dow Corning Co.

C. All products to be 'UL' approved.

D. Refer to Section 07840 - FIRESTOPPING.

2.06 - SLEEVES

A. Provide Schedule 40 steel sleeves for larger than 2" diameter through fire-rated walls, partitions, floors or ceilings.

2.07 - SURFACE METAL RACEWAY

A. All exposed raceways shall be Wiremold 2100 or equal, steel, minimum 0.40" thick base and cover. System shall be complete, with fittings, boxes, etc. A V2186 adjustable offset connector shall be used at the ceiling and a box similar to a V2144-2, shall be used at all devices. Color to be buff. Wiremold to be 'UL' approved. Certain raceways shall be field painted.

PART 3 - EXECUTION

3.01 - INSTALLATION

A. As much as possible, all conduit shall be run concealed within the building construction when installed in finished areas. Exposed circuit and raceway must have prior approval of the Engineer or the EPA On-Site Representative.

B. All conduit shall be substantially supported by pipe straps or suitable clamps or hangers attached to the elements of the building structure to provide rigid installation; in no case shall conduit be attached or supported from adjoining pipe or installed in such a manner as to prevent the ready removal of other pipe for repairs.

C. Thomas and Betts "Ty-Rap" self-locking ties or similar may be used as support of conduits up to 1" which are running horizontal on top of small structural members.

D. Strap iron hangers and wire will not be approved for conduit support.

E. For fasteners, see Division 5, Section 05125 -

MISCELLANEOUS FASTENERS.

F. All conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.

G. All conduits shall be supported from frame only.

H. This Contractor to supply and install all conduit and boxes for duct smoke detectors and all smoke detector sampling tubes.

I. Firestop all openings around conduits when through fire or smoke partitions or walls.

J. Wiremold raceway and boxes to be installed per manufacturer's instructions. Provide special fittings and fasten properly to substrate. Provide vandal-proof screws.

K. Fire alarm conduits shall be identified with multiple wraps of 3" wide yellow tape adjacent multiple wraps of 3" wide red tape. Identification shall occur near each termination, near each branch and every 25’ where conduits are concealed and every 50’ where conduits are exposed.

END

DIVISION 16 - ELECTRICAL

SECTION 16115 - WIRE AND CABLE

PART 1 - GENERAL

1.01 - DESCRIPTION

A. Furnish and install all electrical and electronic conductors for branch circuit wiring, system wiring and control wiring.

B. All wire and cable to be UL approved, NEC standard as manufactured by General Electric, General Cable, Anaconda, Triangle or Rome.

PART 2 - PRODUCTS

2.01 - WIRE AND CABLE

A. All conductors to be copper, unless otherwise noted.

B. All branch circuits shall be NEC types "THHN" (90 degrees C dry locations). Conductors #10 and smaller may be solid, unless otherwise noted. Conductors #8 and larger shall be stranded, unless otherwise noted.

C. Unless otherwise noted, minimum wire size for power branch circuits to be No. 12 AWG and for control and auxiliary systems No. 14 AWG. All home branch circuits exceeding 50 feet in length for 120 volt circuits shall be a minimum of No. 10 AWG or larger where indicated.

D. Conductors for emergency power wiring shall be minimum No. 10.

E. "THHN" wire No. 10 and smaller to be color coded: No. 8 through No. 6 furnished in black and white; No. 4 AWG and larger all black.

F. All network wire from existing fire alarm control panel to new fire alarm expansion modules, all mapnet wiring, and wiring from fire alarm control panel to CRT shall be similar to West Penn No. D975 (No. 18 AWG) two conductor, twisted shielded pair, UL listed, NEC type FPL with overall 75°C PVC red jacket. Audio riser shall be a twisted shielded pair audio riser cable UL listed.

G. All wiring to audible and visual devices shall be No. #12 AWG, THHN color coded red.

H. All speaker wiring shall be similar to West Penn No. D991 (No. 16 AWG) two conductor, twisted shielded pair, UL

listed, NEC type FPL with overall 75°C PVC red jacket.

2.02 - SPLICES

A. Splices in No. 10 AWG and smaller wire to be made with Minnesota Mining Manufacturing Co. insulated "Scotch Locks", Ideal Co. "Wing Nut", T. & B "Piggy" connectors, or with mechanically crimped sleeves as manufactured by T & B or Ideal Company, which shall be insulated with pressure sensitive electrical tape equal to Scotch No. "33+" or No. 88.

B. All taps, terminations or splices, size No. 8 and larger to be made with pressure type mechanical connectors and insulated with electrical tape to 150% of the insulating value of the conductor insulation.

PART 3 - EXECUTION

3.01 - WIRING INSTALLATION

A. Install electrical cables, wires and connectors as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA'S "Standard Installation", and in accordance with recognized industry practices.

B. Wire Color Code shall be required for this work in branch circuit conductors #10 and smaller. The following code shall be used as applicable.

	120/208 Volt
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

Emergency: Same as normal, but with 1/2" red wrapped twice around maximum 12" intervals at access points.

C. Branch circuits to be connected as numbered on drawings. Test and permanently tag by circuit number each circuit wire, except neutrals in panelboard gutter before connecting to panelboard. Numbered adhesive tapes may be used at Contractor's option.

D. Prior to energization, test cable and wire for continuity of circuitry, and also for short circuits. Correct malfunctions when detected.

E. All splices to be in junction boxes or pull boxes only.

DIVISION 16 - ELECTRICAL

SECTION 16130 - BOXES AND PLATES

PART 1 - GENERAL

1.01 - SCOPE

A. Furnish and install all outlet, junction, and pullboxes as indicated on the drawings and as necessary to install the required conduit and wiring in a neat and workmanlike manner.

B. Furnish and install all outlet and junction box covers and wiring device plates.

PART 2 - PRODUCTS

2.01 - STANDARDS

A. Pullboxes and junction boxes shall be in accordance with Code requirements and shall be U.L. labeled.

2.02 - BOXES AND FLUSH WORK

A. Flush outlet, junction and pullboxes shall be pressed steel galvanized or sherardized and shall be a minimum of 4" square or octagonal and shall be National, Steel City, General Electric or equal.

B. Single gang boxes to be pressed steel, galvanized or sherardized and shall be a minimum of 4" long x 2-1/8" wide and shall be National Steel City, General Electric or equal.

C. Provide plaster rings as required in gypsum board partitions.

D. All exposed outlet boxes with conduit connections shall be cast boxes similar to a Thomas & Betts Perfect-Line LT14-2.

E. All exposed outlet boxes with surface metal raceway connection shall be compatible with raceway system and equipment device.

F. Coordinate box sizes with other equipment supplier as required.

2.03 - EXTERIOR BOXES

A. Underground splice box shall be similar to Strongwell, "Quazite", composite "PC" style gasketed, NEMA 4 splice box constructed of non-corrosive polymer concrete and reinforced by a heavy weave fiberglass. Inserts and tamper proof, recessed bolts shall be stainless steel. Cover shall be flush with sidewalk or landscaping and shall be designed for a service load of 8000 lbs. over a 10" square. Cover logo shall say "FIRE ALARM". Box shall be ribbed externally and internally for rigidity, shall be able to be drilled to accept mounting brackets without impairing strength. Cover and box shall be ultraviolet protected.

2.04 - PLATES AND COVERS

A. Blank cover plates shall be beveled stainless steel similar to Hubbell 97151 for single gang box mount, 97152 for two gang box mount, S14 for single gang strap mount or S24 for two gang box mount.

B. Plates shall be Hubbell or approved equal unless otherwise noted.

C. Provide any other special covers as required by Hubbell.

D. As required, special stainless steel blank cover plates shall be constructed to attach to 4 x 4 plaster rings and of sufficient size to cover concrete patching. Edges shall be smooth. No sharp edges shall be permitted.

PART 3 - EXECUTION

3.01 - INSTALLATION

A. All boxes shall be rigidly supported from building structure independent of the conduit system.

B. Close all unused and open knockouts with plugs of the proper size.

C. Provide covers for ALL junction or pull boxes.

D. All junction boxes and cover plates associated with fire alarm system shall be painted red. Indication with red tape is <u>not</u> sufficient.

END

DIVISION 16 - ELECTRICAL

SECTION 16451 - GROUNDING (WIRED SYSTEM)

PART 1 - GENERAL

1.01 - SCOPE

A. All branch circuits over 100 volts shall include a grounding conductor sized in accordance with NEC Table 250-122 except not be smaller than #12 for power circuits and #14 for control circuits. All ground conductors shall be green.

B. The Contractor shall, in the presence of the EPA's On-Site Representative, test all system neutrals to prove they are free of grounds except at the source.

PART 2 - PRODUCTS

2.01 - GENERAL

A. All ground clamps shall be Penn-Union "GPL" type or similar by O.Z. or Burndy.

B. Conduit grounding type bushing shall be T & B Series 3870 or equal with appropriate size ground wire terminal.

C. Enclosures, junction and pull boxes shall utilize a "panel" type ground bar or U.L. listed grounding lugs or screws, as the number of ground conductors dictates.

PART 3 - EXECUTION

3.01 - INSTALLATION

A. All enclosures, boxes, receptacles, etc., shall be grounded by being securely bonded to the grounding conductor. Boxes, conduit, etc., shall not be used as part of the grounding "conductor" system.

B. Enclosures not requiring a ground bar shall have all ground conductors connected together and a pigtail the size of the largest conductor bonded to the enclosure with a single ground connector used for no other purpose.

C. Conduit system shall be electrically continuous. All locknuts shall cut through enameled or painted surfaces on enclosures. Where enclosures and non-current carrying metals are isolated from the conduit system, use bonding jumpers with approved clamps. Where reducing washers are used and where concentric or eccentric knockouts are not completely removed, bonding bushings shall be required.

END

DIVISION 16 - ELECTRICAL

SECTION 16720 - FIRE ALARM/CIVIL DEFENSE SYSTEM

PART 1 - GENERAL

1.01 – SCOPE & RELATED DOCUMENTS

A. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations in connection with the upgrade of the Simplex Fire Alarm System as shown on the drawings and as herein specified.

B. The requirements of the conditions of the Contract, General Conditions and Divisions 1, 2, 5 and 9 apply to the work specified in this section.

C. The complete installation is to conform to the applicable sections of NFPA-70, NFPA-72, Local Code Requirements and National Electrical Code with particular attention to Article 760.

D. The work covered by this section of the specifications is to be coordinated with the related work as specified elsewhere under the project specifications.

E. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:

1. Fire alarm and detection operations
2. Control and monitoring of elevators, smoke control equipment, door hold-open devices, fire suppression systems, emergency power systems, and other equipment as indicated in the drawings and specifications.
3. Two (2) remote annunciator microphone locations.
4. Replacement of existing smoke detectors for elevators, door hold-open devices and computer room. Wiring to remain. Device only to be replaced.
5. Re-connection of wiring to security system in order to make all exterior security gates raise when in alarm mode.
6. Re-connection to Full Containment Building fire alarm system to transmit signal to new FACP to indicate alarm or trouble in the Full Containment Building.
7. Installation of additional contacts, IAM’s, wiring, conduit, etc. to make alarms from self-contained fire suppression systems in four (4) exterior storage sheds addressable to the new FACP, as well as sounding local bell. Three (3) sheds are located north of the dock and one (1) shed is within the cooling tower enclosure.

8. Installation of fire pump monitoring system to monitor phase reversal, loss of power and pump not running.

9. Connection of kitchen exhaust hood ansul system to new FACP.

1.02 - QUALITY ASSURANCE

A. Each and all items of the Simplex Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.

B. The equipment and installation supervision furnished under this specification is to be provided by a manufacturer (independent dealers and/or distributors will NOT be considered) who has been engaged in production of this type (software driven) of equipment for at least ten (10) years, and has a fully-equipped service organization within fifty (50) miles of the installation. Technicians shall be factory trained and NICET certified.

C. All control equipment must have transient protection devices to comply with UL864 requirements.

1.03 - GENERAL DESCRIPTION

A. Furnish and install a complete addressable upgrade to the Simplex Fire Alarm/Civil Defense System as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. The existing system is a 24 VDC horn system. The upgrade shall include an audio/live voice output to new 25 volt speakers. The system shall use closed loop initiating devices circuits with individual zone supervision, individual notification, appliance circuit supervision, incoming and standby power supervision. Include an audio/ live voice system, remote fire department voice communication and annunciator and remote microphone communication, remote miniplex transponders, manual pull stations (fire alarm boxes), automatic smoke detectors, speakers, strobes, fire protection flow switches and tamper switches, and all wiring, connections to devices, outlet boxes, junction boxes, and all other necessary material for a complete operating system. Operation of all speakers and strobes shall be synchronized.

1.04 - SYSTEM DESCRIPTION

A. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary.

The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.

B. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.

C. Recording of Events: Record all alarm, supervisory and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.

D. Wiring/Signal Transmission:

1. Transmission shall be addressable signal transmission, dedicated to fire alarm service only.
2. System connections for initiating (signaling) circuits and notification appliance circuits shall be Class B.
3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

E. Remote Access:

1. FACP shall have the capacity to provide Remote Access through a Dial-Up Service Modem using the public switched telephone system of a private switched telephone system.
2. A personal computer or technician’s laptop, configured with terminal emulation software shall have the ability to access the FACP for diagnostics, maintenance reporting and information gathering.

F. Required Functions: The following are required system functions and operating features:

1. Priority of Signals: Alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority respectively. Signals of a higher-level priority take precedence over signals of lower priority, even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.

2. Noninterfering: The activation of an addressable device does not prevent the receipt of signals from subsequent activations.

3. Transmission to Remote Central Station: Automatically route alarm, supervisory and trouble signals to a remote central station service transmitter provided under another contract.
4. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote annunciators indicating the location and type of device.
5. General Alarm: A system general alarm shall include:

    a. Indication of alarm condition at the FACP and the annunciators.
    b. Identification of the device that is the source of the alarm at the FACP and the annunciators.
    c. Operation of audible and visible notification devices throughout the building until silenced at FACP.
    d. Closing doors normally held open by magnetic door holders.
    e. Shutting down supply and return fans serving zone where alarm is initiated.
    f. Closing smoke dampers on system serving zone where alarm is initiated.
    g. Notifying the central monitoring company.
    h. Initiation of elevator recall in accordance with ASME/ANSI A17.1, when specified detectors are activated.

6. Supervisory Operations: Upon activation of a supervisory device, such as fire pump power failure, AC unit duct mounted or area smoke detector and tamper switch, the system shall operate as follows:

    a. Activate the system supervisory service audible signal and illuminate the LED at the control unit and the graphic annunciator.
    b. Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED “on” indicating off-normal condition.
    c. Record the event in the FACP historical log.
    d. Transmission of supervisory signal to remote central station.

7. Restoring the condition shall cause the Supervisory LED restore system to normal.
8. Alarm Silencing: If the “Alarm Silence” button is pressed, all audible and visible alarm signals shall cease operation.

9. System Reset:

    a. The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for realarming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
    b. Should an alarm condition continue, the system will remain in an alarmed state.

10. Drill: A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.
11. WALKTEST: The system shall have the capacity of eight (8) programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:

    a. The city circuit connection and suppression release circuits shall be bypassed for the testing group.
    b. Control relay functions associated to one (1) of the eight (8) testing groups shall be bypassed.
    c. The control unit shall indicate a trouble condition.
    d. The alarm activation of any initiation device in the testing group shall cause the audible notification appliances to sound a voice announcement, to identify the device.
    e. The unit shall automatically reset itself after signaling is complete.
    f. Any momentary opening of an initiating or notification appliance circuit wiring shall cause the audible signals to voice announce the trouble condition.

G. Analog Smoke Sensors:

1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
2. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value

to automatically compensate for dust, dirt and other conditions that could affect detection operations.

3. Programmable Sensitivity: Photoelectric Smoke Sensors shall have seven (7) sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.
4. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT display or printed for annual recording and logging of the calibration maintenance schedule.
5. The FACP shall automatically indicate when an individual sensor needs cleaning. The system shall provide a means to indicate that a sensor required cleaning. When a sensor's average value reached a predetermined value, three (3) progressive levels of reporting are provided. The first level shall indicate that a sensor is close to a trouble reporting condition and will be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a dirty sensor without creating a trouble in the system. If this indicator is ignored, a second level "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system trouble is reported to the Central Monitoring Station. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.
6. The FACP shall continuously perform an automatic self-test on each sensor which will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.
7. Multi-Sensors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7% obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.
8. Programmable bases: It shall be possible to program relay and sounder bases to operate independently of their associated sensor.
9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.

10. Default Sensitivity shall be set to 3.7% for all air handling units' smoke detectors, exception: smoke detectors associated with elevator recall shall be set to 2.5%.

H. Fire Suppression Monitoring:

1. Water flow: Activation of a water flow switch shall initiate general alarm operations.
2. Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.

I. AUDIBLE ALARM NOTIFICATION

1. The system fire alarm operation subsequent to the alarm activation of any manual station, automatic detection device, or sprinkler flow switch is to be as follows:

a. All speaker appliances shall sound four (4) pre-announcement tones followed by the following digitally recorded evacuation message. Message shall be a male voice, recorded in English by EPA personnel. Message shall be followed by a slow whoop tone.

1) **CUSTOM EVACUATION MESSAGE:**
THE FIRE ALARM HAS BEEN ACTIVATED. PLEASE EVACUATE THE BUILDING USING THE CLOSEST SAFE EXIT. DO NOT USE THE ELEVATORS. (Repeat three [3] times).

2) **CUSTOM ALL CLEAR ANNOUNCEMENT:**
ATTENTION. YOUR ATTENTION PLEASE. THE BUILDING FIRE ALARM CONDITION HAS BEEN CLEARED. YOU MAY RETURN TO NORMAL ACTIVITIES. THE BUILDING FIRE ALARM CONDITION HAS BEEN CLEARED. YOU MAY RETURN TO NORMAL ACTIVITIES. (Repeat three [3] times.)

b. All visible alarm notification appliances shall flash until extinguished by the Alarm Silence Switch.
c. All doors normally held open by door control devices or those associated with smoke detectors shall release when any addressable device is initiated.
d. All fire shutter doors shall be reprogrammed to close only on local smoke detector signal.
e. A supervised signal to notify an approved central station is to be activated. To accommodate and facilitate job site changes, the type of "city connection circuit" is to be on-

site configurable to provide either a "reverse polarity", "local energy", "shunt" or dry contact connection.

f. Smoke detectors associated with air handling system shall deactivate associated air handling system and deliver a trouble signal to the central fire alarm panel and JCI Metasys System.

g. An alarm is to be displayed on the panel display per 1.04.C of these specifications. The alarm LED shall flash on the control panel and the remote annunciators until the alarm has been acknowledged at the control panel or the remote annunciator. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone after acknowledged shall flash the alarm LED on the control panel and the panel display shall show the new alarm information.

    1) Pulsing alarm tone shall occur within the control panel and the remote annunciators until acknowledge.

    2) The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process normal operation. The Alarm Verification is to operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation is to be selectable by device.

        a) The control panel shall have the capability to display the number of times a zone has gone into a verification mode.

    3) The control panel is to have a dedicated supervisory service LED and a dedicated supervisory service acknowledge switch.

        a) The activation of any sprinkler valve tamper switch shall activate the system supervisory service audible signal and illuminate the LED at the control panel and the remote annunciators. Differentiation between valve tamper activation and opens and/or grounds on fire alarm initiation circuit wiring shall be provided.

b) Activating the Supervisory Service Acknowledge Switch will silence the supervisory audible signal while maintaining the Supervisory Service LED on indication that the tamper contact is still in the off-normal state.
c) Restoring the valve to the normal position shall cause the Supervisory Service LED to extinguish thus indicating restoration to normal position.

4) Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system.
5) Alarm and trouble conditions shall be immediately displayed on the control panel front alphanumeric display if more alarms or troubles are in the system, the operator may scroll to display new alarms.
6) The system shall have an alarm list key that will allow the operator to display all alarms, troubles, and supervisory service conditions with the time of occurrence. This shall allow for the determination of not only the most recent alarm but also may indicate the path that the fire is taking.
7) All doors normally held open by door control devices shall release upon AC power failure.
8) The control panel shall be capable of supplying 7 Amps @ 24VDC power output for external system use.
9) The control panel shall be outfitted with speaker on/off switches for each floor. Switches shall be monitored for trouble.

2. The system civil defense tornado alarm operation subsequent to the activation of the key switch located in the second basement control room or the remote microphone annunciators is to be as follows:

a. All speaker appliances shall sound a pre announcement tone (distinct from fire alarm tone) followed by the following digitally recorded excavation message. Message shall be a male voice, recorded in English by EPA personnel.

1) **CUSTOM EVACUATION MESSAGE**
A TORNADO WARNING HAS BEEN ISSUED. PLEASE TAKE REFUGE IN THE BASEMENT OR INTERIOR OFFICES. STAY AWAY FROM ALL EXTERIOR WINDOWS AND OPENINGS. (Repeat three [3] times.)

3. All other civil defense alarm operations shall be via voice instructions from microphone located in second basement control room or the remote microphone annuciators.

J. MANUAL VOICE PAGING

1. The system shall be configured to allow voice paging. Upon activation of any speaker manual control switch, the alarm tone shall be sounded over all speakers in that group.
2. The control panel operator shall be able to make announcements via the push-to-talk paging microphone over the pre-selected speakers.
3. Facility for total building paging shall be accomplished by the means of an "All Call" switch.

1.07 - POWER REQUIREMENTS

A. Emergency power to fire alarm system is to be provided by existing emergency generator. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of emergency 120 VAC power in a normal supervisory mode for a period of four (4) hours with 15 minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

B. The new remote miniplex transponders on the 2nd and 5th floors shall each receive a dedicated 20 amp emergency 120 VAC circuit.

C. All circuits requiring system operating power shall be 24 VDC and shall be individually fused at the control panel.

D. Strobe circuits shall have a maximum of 1.65 amps per circuit.

1.08 - MULTIPLE ADDRESSABLE PERIPHERAL NETWORK

A. The system must provide communication with all initiating and control devices individually. All of these devices are to be individually annunciated at the control panel. Annunciation shall include Alarm, Trouble, Open, Short, Ground, and Device Fail/or Incorrect Device.

B. All addressable devices are to have the capability of being disabled or enabled individually.

C. Up to 127 addressable devices may be multi-dropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

D. Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact.

E. Wiring types will be approved by the equipment manufacturer. The system must allow up to 2,500 feet wire length to the furthest addressable device.

PART 2 - PRODUCTS

2.01 - MANUFACTURERS

A. Simplex Time Recorder. No other manufacturers shall be acceptable. Please contact Doug Barton (513) 874-1227 for information.

2.02 - AUDIO FIRE ALARM CONTROL PANEL (FACP)

A. In the second basement boiler control room, provide and install a Simplex type 4100U Audio Fire Alarm Control Panel.

B. General: Comply with UL 864, "Control Units for Fire-Protective Signaling Systems."

C. The following FACP hardware shall be provided:

1. Power Limited base panel with red cabinet and door, 120 VAC input power.
2. 2,000 point capacity where one (1) point equals one (1) monitor (input) or one (1) control (output).
3. 2,000 points of Network Annunciation at FACP Display when applied as a Network Node.
4. 2,000 points of annunciation where one (1) point of annunciation equals:

    a) One (1) LED driver output on a graphic driver or one (1) switch input on a graphic switch input module.
    b) One (1) LED on panel or one (1) switch on panel.

5. From all battery charging circuits in the system provide battery voltage and ammeter readouts on The FCP LCD Display.

6. Municipal City Circuit Connection with Disconnect switch, 24VDC Remote Station (reverse polarity), local energy, shunt master box or a form "C" contact output.
7. One (1) Auxiliary electronically resettable fused 2A @ 24VDC Output, with programmable disconnect operation for 4-wire detector reset.
8. One (1) Auxiliary Relay, SPDT 2A @ 32VDC, programmable as a trouble relay, either as normally energized or de-energized or as an auxiliary control.
9. Where required provide intelligent Remote Battery Charger for charging up to 110Ah batteries.
10. Power Supplied with integral intelligent Notification Appliance Circuit Class B for system expansion.
11. Four (4) form "C" Auxiliary Relay Circuits (Form C contacts rated 2A @ 24VDC, resistive), operation is programmable for trouble, alarm, supervisory of other fire response functions. Relays shall be capable of switching up to 1/2A @ 120VAC, inductive.
12. The FACP shall support six (6) RS-232-C ports and one (1) service port.
13. Remote Unit Interface: Supervised serial communication channel for control and monitoring of remotely located microphones, annunciators and I/O panels.
14. Programmable DACT for either Common Event Reporting or per Point Reporting.
15. Service Port Modem for dial in passcode access to all fire control panel information.

C. Cabinet: Lockable steel enclosure. Arrange unit so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control unit, provide exactly matching modular unit enclosures.

D. Alphanumeric display and System controls: Panel shall include an 80 character LCD display to indicate alarm, supervisory and component status messages and shall include a keypad for use in entering and executing control commands.

E. Voice Alarm: Provide an emergency communication system, integral with the FACP, including voice alarm system components, microphones, amplifiers and tone generators. Features include:

1. Amplifiers comply with UL 1711, "Amplifiers for Fire Protective Signaling Systems." Amplifiers shall provide an onboard local mode temporal coded horn tone as a default backup tone. Test switches on the amplifier shall be provided to test and observe amplifier backup switch-over. Each amplifier shall communicate to the host panel amplifier and NAC circuit voltage and current levels for display on the

user interface.
2. All announcements are made over dedicated, supervised communication lines. All risers shall support Class B wiring for each audio channel.
3. Emergency voice communication audio controller module shall provide up to 32 minutes of message memory for digitally stored messages. Provide supervised connections for master microphone and up to five (5) remote microphones.
4. Status annunciator indicating the status of the various voice alarm speaker zones.

F. Distributed Module Operation: FACP shall be capable of allowing remote location of the following modules; interface of such modules shall be through a Style 4 (Class B) supervised serial communications channel (SLC):

1. Amplifiers, voice and telephone control circuits
2. Addressable Signaling Line Circuits
3. Initiating Device Circuits
4. Notification Appliance Circuits
5. Auxiliary Control Circuits
6. Graphic Annunciator LED/Switch Control Modules

G. Provide four (4) new Remote Miniplex Transponders as shown on the drawings. Panels shall be Simplex 4100-8019 Miniplex Transponder.

2.03 - ADDRESSABLE DEVICE TYPES

A. General
The system control panel, over its two wire multi-drop channel, must be capable of communicating with the types of addressable devices specified below. Addressable devices will be located as shown on the drawings.

B. Duct-Mounted Photoelectric Detector Head Simplex #4098-9756 base with head

1. The Photoelectric type detector shall be a plug-in unit which mounts to a twist-lock base, and shall be UL listed. the detectors shall be of the solid state photoelectric type and shall contain no radioactive material. They will use a pulsed infrared LED light source and be sealed against rear air flow entry. All smoke detectors shall be True Alarm.
2. The detector shall be compatible with other addressable detectors, addressable manual stations, and addressable Zone Adaptor Modules on the same circuit. The detector shall also fit into a non-addressable base that is capable of being monitored by an addressable Zone Adaptor Module. Smoke detector shall be furnished with two (2) contacts.

3. There shall be no limit to the number of detectors or Zone Adaptor Modules which may be activated or "In alarm" simultaneously.
4. Electrical Contractor shall extend conduit and wiring from smoke detector to direct digital control system controller. Termination of wiring to controller shall be performed by the Automatic Temperature Control Sub-Contractor.

C. Area Photoelectric Detector Head

1. The addressable smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. Simplex Type 4098-9714 Smoke Sensor with Simplex Type 4098-9792 Base.
2. The sensors shall be listed to UL Standard 268 and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications.
3. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel (once every four (4) seconds). When the control panel determines that a sensor is in the alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable.
4. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.
5. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed.
6. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
7. Electrical contractor shall extend conduit and wiring from smoke detector to direct digital control system controller. Termination of wiring to controller shall be performed by automatic temperature control subcontractor.

D. Area Electronic Heat Detector

1. The addressable electronic heat detector shall be of the thermistor type for fixed temperature sensing at 200°F and rate-of-rise operation, Simplex 4-wire base, Type 4098-9733 heat detector with Simplex Type 4098-9792 base.
2. Detectors shall be UL and ULC listed for a spacing of 70' and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be ceiling mounted.
3. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel (once every four (4) seconds). When the control panel determines that a sensor is in the alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable.
4. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed.
5. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

E. Addressable Pull Stations (Manual Fire Alarm Boxes)Simplex #4099-9001 w/2975-9178 back box.

1. Addressable pull stations will contain electronics that communicate the station's status (alarm, normal) to the control panel over two (2) wires which also provide power to the pull station. The address will be set on each station. The stations will be manufactured from high impact red Lexan. Lettering will be raised and painted white. The station will mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks. Pull stations will be single action.
2. The front of the station is to be hinged to a backplate assembly and must be opened with a key to reset the station. The key shall be common with the control panels. Stations which use Allen wrenches or special tools to reset, will not be accepted. The station shall consist of high impact Lexan, red in color.
3. The addressable manual station shall be capable of field programming of its "address" location on an addressable signaling line circuit.

4. There shall be no limit to the number of stations, detectors, or Zone Adaptor Modules, which may be activated or "in alarm" simultaneously.
5. The addressable manual station shall be Underwriters' Laboratories Inc. listed.
6. Certain pull stations shall have tamper-proof, clear Lexan® shield and red frame that easily fits over manual pull stations. When shield is lifted to gain access to the station, a battery-powered piercing warning horn shall be activated. The horn shall be silenced by lowering and realigning the shield. The horn shall provide 85dB at 10' and shall be powered by a 9 VDC battery.

F. Speaker notification appliances shall be listed to UL 1480.

1. The speaker appliances shall be Wheelock Series E Speakers and the speaker strobe appliances shall be Wheelock Series E Speaker Strobes or approved equals. The speakers shall be UL listed under Standard 1490 for fire Protective Service and speakers equipped with strobes shall be listed under UL Standard 1971 for Emergency Devices for the Hearing-Impaired. In addition, the strobes shall be certified to meet the requirements of FCC Part 15, Class B.
2. All speakers shall be designed for a field selectable input of either 25 or 70 VRMS, with selectable power taps from 1/8 watt to 2 watts. All models shall have listed sound output of up to 87 dB at 10' and a listed frequency response of 400 to 4000 Hz. The speaker shall also incorporate a sealed back construction. All inputs shall employ terminals that accept #12 to #18 AWG wire sizes. The strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Xenon flash tube enclosed in a rugged Lexan® lens. The strobe shall be of low current design. The strobe intensity shall have field selectable settings and shall be rated per UL Standard 1971 at 15/30/75/110cd or 135/185cd for wall mount and 15/30/75/95cd or 115/117cd for ceiling mount. The selector switch for selecting the candela shall be tamper resistant. The 1575 candela strobe shall be specified when 15 candela UL Standard 1971 Listing with 75 candela on-axis is required (e.g. ADA compliance). The strobe portion of the appliance shall be compatible with Wheelock's SM, DSM sync modules or Wheelock's PS-12/24-8MP Power Supply with build-in Patented Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the sync module or Power Supply fails to operate (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate.

3. The speaker and speaker strobe appliances shall be designed for indoor surface or flush mounting.
4. The speaker and speaker strobe shall incorporate a speaker mounting plate with a grille cover which is secured with two screws for a level, aesthetic finish and shall mount to standard electrical hardware requiring no additional trimplate or adapter.
5. The finish of the Series E speakers and strobe speakers shall be red.
6. All speaker and speaker strobe appliances shall be backward compatible.
7. The Weatherproof Low Profile Speaker Strobe shall be Wheelock Series ET70WP-2475W-FR or approved equal. The Series ET70WP-2475W-FR shall meet and be listed for UL Standard 1638 (Standard for Visual Signaling Appliances) for Indoor/Outdoor use, Fire Protective Service and UL Standard 1480 (Standard for Speaker Appliances). The strobe portion of the ET70WP-2475W-FR shall produce a flash rate of 30-62 flashes per minute over The Regulated Voltage Range of 16 to 33 VDC and shall incorporate an Xenon flashtube enclosed in a rugged Lexan® lens to provide maximum visibility and reliability for effective visible signaling. The strobe shall be rated at 75cd and shall operate over an extended temperature range of -31°F to 150°F (-35°C to 66°C) and 180cd at 77°F (25°C) and be listed for a maximum humidity of 95% RH. For outdoor applications, the ET70WP-2475W-FR shall be wall mounted to a weatherproof back box (IOB). The speakers shall be designed for multiple power requirements with a high dBA output at each power tap. The low profile model shall offer a choice of field selectable taps, 1/8W to 8W for either 25.0 VRMS or 70.0 VRMS audio systems. The low profile design shall incorporate a high efficiency speaker for maximum output at minimum power across a frequency range of 400Hz to 4000Hz and features a sealed back construction for extra protection and improved audibility.
8. The strobe portion of the appliance shall be compatible with Wheelock's SM, DSM sync modules or Wheelock's PS-12/24-8MP Power Supply with built-in Patented Sync Protocol. If the sync module or sync protocol in the Power Supply shall fail to operate (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate.

G. Zone Adaptor Module - Individual Adaptor Module
Zone Adaptor Modules shall be used for monitoring of water flow, valve tamper, non-addressable detectors, self contained fire suppression systems and for control of evacuation indicating appliances and AHU systems.

1. An addressable interface module shall be provided for interfacing normally open direct contact devices to an

addressable signaling line circuit. The device shall be a Simplex type Zone Adaptor Module (ZAM)or Individual Adaptor Module (IAM).

2. ZAM's and IAM's will be capable of mounting in a standard outlet box. ZAM's will include cover plates to allow surface or flush mounting. ZAM's will receive their 24VDC power from a separate two (2) wire pair running from an appropriate power supply.
3. There shall be two types of devices:
   Type 1: Monitor
   Type 2: Control
4. For Type 1 above:

   a. For conventional 2-wire smoke detector and/or contact device monitoring with Style B or Style D (NFPA-72 initiating device circuit) wiring supervision. This type of addressable device module will monitor N/O contact devices as specified elsewhere. The supervision of the initiating device circuit wiring will be Style B. These ZAM's will communicate the zone's status (normal, alarm, trouble) to the control panel. Simplex Type 4090-9001.

5. For Type 2 above:

   a. For non-supervised control Simplex #4090-9002. This type of addressable device will provide double pole double throw relay switching for loads up to 120VAC. It will contain easily replaceable 2 amp fuse, one on each common leg of the relay.

6. The ZAM & IAM shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should the ZAM or IAM become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel.
7. The ZAM or IAM shall be capable of being programmed for its "address" location on the addressable device signaling line circuit. The ZAM shall be compatible with addressable manual stations and addressable detectors on the same addressable circuit.
8. All devices will be supervised for trouble conditions. The system control panel will be capable of indicating the type of trouble condition (open, short, device missing/failed). Should a device fail, it will not hinder the operation of other system devices. Should a problem occur on a particular wire run, it will not affect other wire runs.

2.04 - REMOTE CRTS AND PRINTERS

A. Fire Alarm Control Unit shall be capable of operating remote CRT's and/or printers; output shall be ASCII from an RS-232-C connection with an adjustable baud rate.

B. Each RS-232-C port shall be capable of supporting and supervising a remote Printer; the FACP shall support as many as two (2) remote CRT displays or four (4) printers. The Fire Alarm Control Panel shall support up to five (5) RS-232-C ports.

2.05 - REMOTE LCD ANNUNCIATORS/MICROPHONE STATIONS

A. Provide two (2) Remote LCD Annunciators/Microphone Stations with the same "look and feel" as the FACP operator interface. The Remote LCD Annunciators shall use the same Primary Acknowledge, Silence and Reset Keys, Status LEDs and LCD Display as the FACP.

B. Annunciators shall have super-twist LCD display with two (2) lines of 40 characters each. Annunciator shall be provided with four (4) programmable control switches and associated LEDs.

C. Under normal conditions the LCD shall display a "SYSTEM IS NORMAL" message and the current time and date.

D. Should an abnormal condition be detected the appropriate LED (Alarm, Supervisory or Trouble) shall flash. The unit audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions.

E. The LCD shall display the following information relative to the abnormal condition of a point in the system:

1. 40 character custom location label.
2. Type of device (e.g., smoke, pull station, waterflow).
3. Point status (e.g., alarm, trouble).

F. Operator keys shall be key switch enabled to prevent unauthorized use. The key shall only be removable in the disabled position.

G. Microphone shall be for making voice announcements by the fire department or EPA personnel.

G. One (1) remote annunciator/microphone station shall be located in the exterior guard shack near the front entrance. Location of panel shall be coordinated with EPA On-Site Representative.

H. One (1) remote annunciator/microphone station shall be located in Room 243, receptionist area for the Director's

Office of Administration and Resources Management. Electrical Contractor shall provide a custom, stained, hardwood cabinet to house the remote station. Location of enclosed station, construction of enclosure and enclosure finish shall be determined by the EPA On-Site Representative.

2.06 - SYSTEM PRINTER

A. General: Provide a dot-matrix type printer listed an labeled as an integral part of the fire alarm system.

PART 3 - EXECUTION

3.01 - INSTALLATION

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC - Article 760 A and C, Power - Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC-Article 760 A and B. Wiring shall be checked and tested to prove the system is free of shorts, opens, grounds, and that the insulation resistance between current carrying conductors is 10 megaohms or greater. Upon completion, the contractor shall so certify in writing to the owner. Final termination to central panel and preliminary testing shall be performed during facility non-occupied hours. All junction boxes shall be sprayed red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.

B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

C. Removal of existing fire alarm and civil defense alarms shall not occur until the new system is fully operational.

D. Wiring Installation:

1. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AHJ and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70, National Electric Code (NEC).
2. Contractor shall obtain written instruction regarding the appropriate wire/cable to be used for this installation from the Fire Alarm System Manufacturer. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.

3. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one (1) color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.
4. All fire alarm wiring shall be installed in conduit or exposed raceways.

E. Installation Caution: All conduit and wiring shall be installed in a manner not to impede the removal and replacement of existing supply ductwork in all corridors, entrance duct to each room, AC unit risers and all AC unit supply ducts in the second basement. Supply ductwork is scheduled to be replaced in a future project.

3.02 - FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing and adjustment of the system.

B. Service personnel shall be qualified and experienced in the inspection, testing and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:

1. Factory trained and certified.
2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
3. International Municipal Signal Association (IMSA) fire alarm certified.
4. Certified by a state or local authority.
5. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.

C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pre-testing. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.

D. Final Test Notice: Provide a fourteen (14) day minimum notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests and detailed test results in the form of a test log.

H. Final Test and Certificate of Completion:

1. Test the system as required by the EPA Safety Officer.

I. All tests shall be performed during EPA facility non-working hours.

J. System shall be tested in conjunction with Annex Building that is currently under construction. If Annex Building system has been tested, the system shall be retested as part of the Main Building.

3.03 - CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt and debris. Clean unit internally using methods and materials recommended by manufacturer.

B. Occupancy Adjustments: When requested within one (1) year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three (3) visits to the site for this purpose.

3.04 - TRAINING

A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.

1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing and preventive maintaining of the system. Provide a minimum of eight (8) hours' training.
2. Schedule training with the Owner at least fourteen (14) days in advance.

3.05 - ADDITIONAL DEVICES

A. Contractor shall provide 5% each additional speaker strobes and manual pull stations. If devices are not used in final arrangement, the devices shall be turned over to the EPA.

3.06 - SHOP DRAWINGS

A. If stamped drawings are required by the State Fire Marshall, they shall be stamped by an Engineer registered in the State of Ohio at the expense of the fire alarm system manufacturer.

3.07 - WARRANTY

A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of EPA's final acceptance of the project.

END

DIVISION 16 - ELECTRIC

SECTION 16950 - DIRECT DIGITAL CONTROL SYSTEM

PART 1 - GENERAL

1.01 - SCOPE

A. A modification and addition to the existing system of automatic temperature controls shall be performed under this contract, as required to accomplish the indication of air handling units smoke detectors trouble notification.

B. Work shall be performed as a sub-contract to the Electrical Contractor.

1.02 - QUALIFICATION OF BIDDER

A. All bidders must be temperature control contractors in the business of installing direct digital temperature controls for over ten (10) years.

B. All bidders must have installed and completed at least ten (10) direct digital temperature control jobs of similar design using the same model equipment as specified.

1. All bidders must be licensed factory representatives and installers for Johnson Controls, Inc. in the local area, and shall have a local engineering and service office within 25 miles of the job site.
2. All bidders must have demonstrated capabilities of performing diagnostics and repairs on electronic systems including both hardware and software.
3. Manufacturer: Johnson Controls Metasys.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 -

Electrical contractor shall extend conduit and wiring from smoke detector to existing DDC controllers. DDC contractor shall terminate wiring to controller.

3.02 -

DDC Contractor shall perform all revisions to software to perform work described in points list.

3.03 -

Furnish a complete set of drawings showing the kind of control equipment for each of the various systems and their functions, along with indication on the drawing of and sequence of

operation. These drawings shall be submitted for approval to the Engineer, together with a complete brochure describing the equipment and their functions and operation.

3.04 -

Upon completion of the control system, the Control Contractor shall adjust all components on the system. Each control function shall be demonstrated to function properly, to the satisfaction of the Engineer and the EPA's On-Site Representative. Provide a complete instruction manual covering the function and operation of all components. At the time of demonstration, each function shall be simulated to insure that controls respond properly to all signals, and the EPA's On-Site Representative shall be instructed in the proper operation of the system.

3.05 -

During the first year of operation, after acceptance by the EPA's On-Site Representative, the Control Contractor shall provide complete service to adjust or assist the EPA Service personnel in adjusting the equipment. This shall be done without additional expense to the EPA. This work shall include revisions to DDC software programs and controller, and all PC front end software upgrades. All software shall be provided to the EPA's On-Site Representative in disk form, including back-ups of final field programs.

PART 4 - DIGITAL CONTROL SYSTEM POINTS LIST

4.01 -

The following list shall be the minimum points required of the digital control system. If or when additional points are required to accomplish the sequences of control specified, these points shall also be provided. The point types are identified as follows:

DI - Contact Input (NO or NC)
DO - Contact Output (NO or NC)
AI - Analog Input
AO - Analog Output
PI - Pulsed Input

Type	**Description**	**Quantity**
DI	AC-1 Supply Smoke Detector Trouble (See Note 1)	1
DI	AC-1 Return Smoke Detector Trouble	1
DI	AC-2 Supply Smoke Detector Trouble	1
DI	AC-3 Supply Smoke Detector Trouble	1

Type	Description	Quantity
DI	AC-4 Supply Smoke Detector Trouble	1
DI	AC-5 Supply Smoke Detector Trouble (See Note 1)	1
DI	AC-5 Return Smoke Detector Trouble	1
DI	AC-6 Supply Smoke Detector Trouble	1
DI	AC-6 Return Smoke Detector Trouble	1
DI	AC-7 Supply Smoke Detector Trouble (See Note 1)	1
DI	AC-7 Return Smoke Detector Trouble	1
DI	AC-8 Supply Smoke Detector Trouble (See Note 1)	1
DI	AC-8 Return Smoke Detector Trouble	1
DI	HV-1 Supply Smoke Detector Trouble	1
DI	HV-2 Supply Smoke Detector Trouble	1
DI	HV-3 Supply Smoke Detector Trouble	1
DI	V-1 Supply Smoke Detector Trouble	1
DI	V-2 Supply Smoke Detector Trouble	1
DI	AC-9 Area Smoke Detector Trouble	1
DI	AC-13 Area Smoke Detector Trouble	1
DI	AC-18 Area Smoke Detector Trouble	1
DI	AC-19 Area Smoke Detector Trouble	1
DI	AC-22 Area Smoke Detector Trouble	1
DI	AC-30 Area Smoke Detector Trouble	1
DI	AC-55 Area Smoke Detector Trouble	1
DI	AC-56 Area Smoke Detector Trouble	1

Note 1. Reprogram AC unit smoke detector trouble to indicate AC unit supply smoke detector trouble.